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VOICE OF THE ELECTRIC UTILITY INDUSTRY

PacifiCorp is 21st Utility of the Year

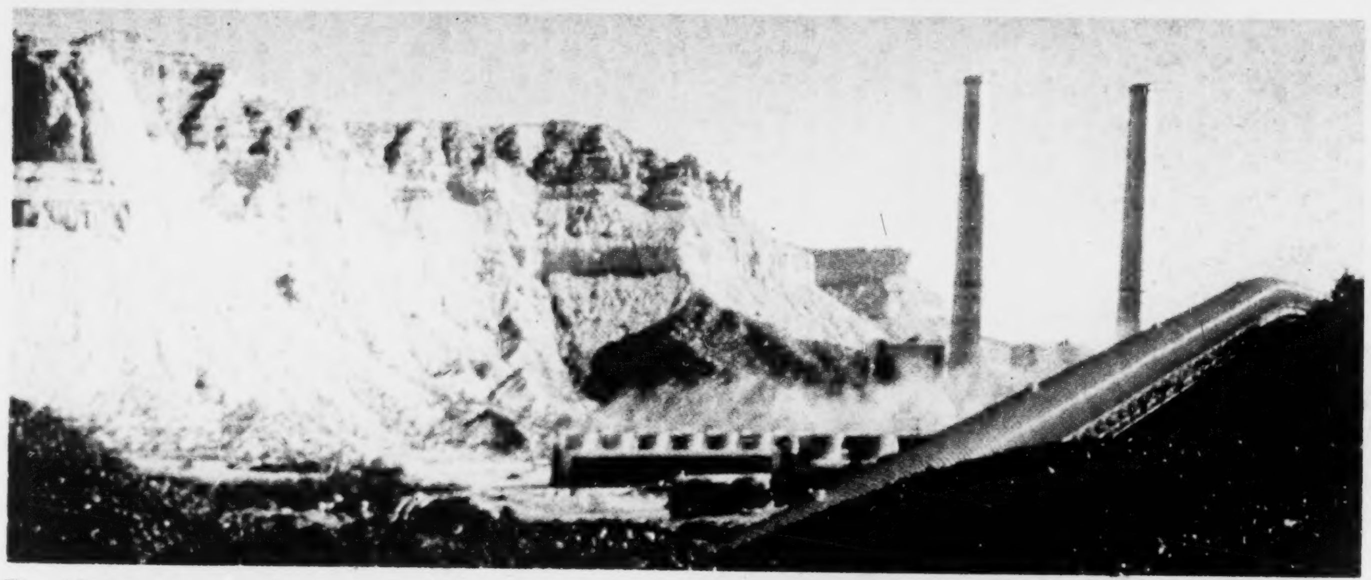
BARRINGTON, IL—PacifiCorp has been named the industry's 1989 Electric Utility of the Year by *Electric Light & Power.* This diversified utility was chosen for its entrepreneurial spirit, successful positioning in its various markets, and insight in its mergers and acquisitions—most recently, the merger with Utah Power & Light Co.

PacifiCorp is the 21st company to be selected since the Utility of the Year program was launched in 1969.

Based in Portland, OR, and in business since 1910, PacifiCorp derives 61-percent of its $3.5 billion in annual revenues from providing electric service to seven western states. With the UP&L merger, it is the 12th largest U.S. electric utility in net income.

EL&P's special report on PacifiCorp begins on page 12

"PacifiCorp has been an industry leader in successful diversification, independence and using the strengths of the various divisions to enhance the corporation synergistically," said Robert A. Lincicome, *EL&P* editor-in-chief.



The Hunter power plant, named after a former Utah Power & Light Co. chairman, is now owned and operated by PacifiCorp's Utah Power Division. Coal is trucked 10 miles from an underground mine.

When the 17-month merger with UP&L was completed Jan. 9, the companies' transition teams had already established plans for how it was to progress. This advance planning allowed for almost immediate savings and opportunities in the wholesale power market when a cold snap hit in February.

"The complementary nature of the electric divisions strategically positions the company for growth through the 1990s. Now PacifiCorp is following through with a program-by-program analysis, keeping the best of both companies," Lincicome pointed out.

Upon hearing of the award, top executives at PacifiCorp immediately credited the hard work and dedication of employees at all levels in all divisions for the company's success.

"We have a huge group of wonderful, dedicated people," explained Don C. Frisbee, chairman. "People attracted here have the entrepreneurial spirit. It's a different environment from the typical utility."

That spirit is one fostered from a corporate policy of allowing the various divisions to excel on their own merits. PacifiCorp owns:

- Two electric utility divisions, Pacific Power and Utah Power.
- 83-percent of NERCO Inc., a mining and resource development subsidiary.
- 87-percent of Pacific Telecom Inc., a local and long distance telecommunications firm.
- Various financial services.

The award will be presented to PacifiCorp's management on Nov. 15.

Electric Utility of the Year 1969-1989

1969	Sierra Pacific Power
1970	Florida Power Corp.
1971	Virginia Electric & Power
1972	Northern States Power
1973	Carolina Power & Light
1974	Florida Power & Light
1975	Southern Calif. Edison
1976	Tampa Electric
1977	Duke Power
1978	Southwestern P.S.
1979	New England Electric
1980	Boston Edison
1981	Atlantic Electric
1982	Wisconsin Electric Power
1983	Oklahoma Gas & Electric
1984	Potomac Electric
1985	South Carolina E&G
1986	Minnesota Power
1987	Consumers Power
1988	General Public Utilities
1989	PacifiCorp

ABB exercises option to acquire Westinghouse T&D joint venture

NEW YORK—Asea Brown Boveri announced its intention to acquire the 55 percent share held by Westinghouse Corp. in the jointly-owned Westinghouse ABB Power Transmission and Distribution Co.

ABB thus exercises its call option from the joint venture agreement last February. ABB will pay about $370 million for Westinghouse's share when the transaction is completed Dec. 29, 1989, at which time the Westinghouse ABB Power T&D Co. will cease to exist and its operations and employees will become part of ABB.

Goran Lindahl, executive vice president of ABB Asea Brown Boveri Ltd., Zurich, and head of its worldwide power transmission business, commented during the announcement in New York, "This action shows ABB's strong commitment to the U.S. and our determination to be close to our clients. With this significant addition, primarily to our business in the United States, but also to our operation in Argentina and Brazil, we will further enhance our capability to serve our utility and industrial markets."

Metering stays in Raleigh

Its worldwide electric metering business will be based in Raleigh, NC. This division will coordinate all strategic market and product efforts on a worldwide basis.

The Westinghouse ABB Power T&D Co. estimated 1989 sales of about $1

Continued on page 7

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Earthquake, p.18

Just 26 days after the Red Crosses' worst disaster ever—Hurricane Hugo—an Oct. 17 earthquake devastated areas in California's Bay Area. Preliminary utility damages are given on page 18. Watch for details in December.

FERC Chairman Martha Hesse resigned for a position at First Chicago Corp., parent of Chicago's First National Bank. Texas attorney Martin Allday is the administration's choice for Commissioner Charles Stalon's expired term, and the odds-on favorite for chairman.

FERC's Transmission Task Force released its report, summarizing wheeling issues. Some sources say it favors IPPs.

Hurricane Hugo cleanup reflects heroic efforts—p.3

New firm offers one-stop shopping for coal plants

NEW YORK—Duke Power of Charlotte, NC, and Fluor Daniel Corporation of Irvine, CA, announced the formation of a new company to provide a full range of services for new and existing coal-fired power plants.

The new company, Duke/Fluor Daniel, will be headquartered in Charlotte with operating centers in both Charlotte and Chicago. It is organized as a 50-50 partnership with resources assigned from each parent company.

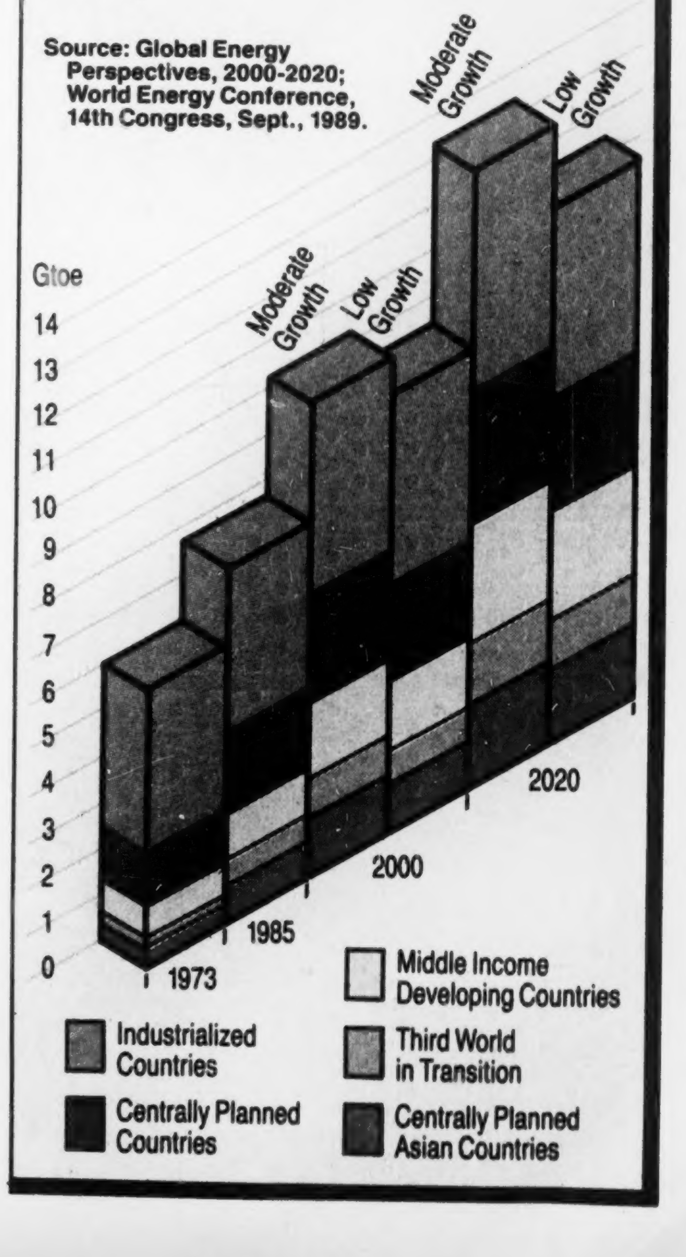
Ronald Green, president of the new company, said, "We offer the electric

Continued on page 6

PRIMARY ENERGY DEMAND

World-wide demand for primary energy is expected to increase to as much as 13.5 Gigatons of oil equivalent (Gtoe) by 2020. As shown in the chart, developing nations' share will increase almost 50 percent from the 1985 level, while the share of the western industrialized countries will decline from 47 to 36 percent. In terms of sheer volume, the total Third World demand by 2020 could be more than the combined 1990 demand of the Industrialized nations and centrally-planned countries in Europe. Countries above the equator will average use of about 5 toe per capita, while per-capita demand in nations south of the equator still will be below 1.0 toe.

Source: Global Energy Perspectives, 2000-2020; World Energy Conference, 14th Congress, Sept., 1989.



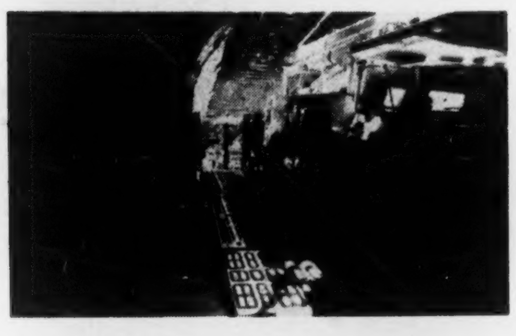
NEWS BRIEFS

JILL MINNER, Special Projects Editor

PSI asks FERC to okay flexible pricing for wholesale power sales

Public Service Indiana has asked the Federal Energy Regulatory Commission to allow it to sell long-term, wholesale power at negotiated prices. "We see selling our power at market prices to other utilities as a way to rebuild our financial health and mitigate future rate increases," explained PSI Chairman James E. Rogers Jr. "In exchange for increased pricing flexibility from FERC, we will also agree to allow utility and non-utility power generators greater access to our transmission system," Rogers added. If its request is approved, the utility said it hopes to begin selling power at market prices by 1990.

SEI sends help to areas damaged by hurricane



Southern Electric International, a subsidiary of The Southern Company, coordinated the deployment of engineers, linemen and equipment to the Virgin Islands in the wake of Hurricane Hugo. Above, a bucket truck is loaded aboard a military transport in Birmingham, AL, for delivery to St. Croix.

Dept. of Energy grants: schools receive $6M; small businesses apply

The Department of Energy announced that it has chosen 18 universities to receive grants in nuclear engineering. DOE said the grants, which will total $6 million over three years, are part of a program to meet the nation's need for advances in nuclear engineering science and technology. "The education of new nuclear-trained engineers is a key element of the program—each grant award will include funding for graduate students to pursue advanced degrees in nuclear technology," stated Secretary of Energy James D. Watkins.

Grant applications are being accepted by the DOE as part of its eighth annual Small Business Innovation Research program. The department said its program is designed to strengthen the role of small, innovative firms (under 500 employees) in areas of research and development which are federally funded. Approximately 120 winners will receive awards of up to $50,000 to explore the feasibility of their ideas, according to DOE. In addition, another $500,000 will be available for those ideas with the most potential to meet the program's objectives. The deadline for grant applications is Jan. 23, 1990. For more information contact: SBIR Program Manager, U.S. Department of Energy, Washington, DC, 20545; (301) 353-5707.

Insurance pools refund nuclear plant operators

As part of an Industry Credit Rating Plan, nuclear power plant operators have received insurance premium refunds of over $9 million, according to American Nuclear Insurers (ANI) President Burt C. Proom. Under the plan, operated by ANI and Mutual Atomic Energy Liability Underwriters, 70 percent of each year's liability insurance premium is put into a reserve fund which is used to pay claims and claim expenses. After a ten-year period, the remainder of the fund is refunded to policyholders. "We believe these refunds illustrate the insurance industry's continuing confidence in the safety of nuclear power," stated Proom.

SERI names director; invention wins award

Gene Mannella was appointed managing director of the Solar Energy Research Institute. Mannella, formerly director of Washington operations at the Electric Power Research Institute, succeeds H.M. Hubbard who will serve as SERI's executive director. SERI is owned by the Department of Energy and operated by the Midwest Research Institute.

In other news, a SERI invention was recognized by Research and Development magazine as one of the most significant technological advances in 1989. The Spectroscopic Scanning Tunneling Microscope was developed by Lawrence Kazmerski, principal scientist and manager of the photovoltaic measurements and performance branch at SERI's Solar Electric Research Division. The microscope makes it possible to view different atomic species, such as silicon and oxygen on a crystalline surface.

Landguth is president at Black Hills Corp.

Daniel Landguth, formerly president and chief operating officer of Black Hills Power and Light Co., was named president of Black Hills Corp. He succeeds Larry Owen, who will continue as chairman and chief executive officer. Everett Hoyt replaces Landguth at Black Hills Power and Light Co.

PGE announces senior managment changes

Portland General Electric and Portland General Corp. recently announced some senior managment changes. E. Kay Stepp was appointed president of PGE, responsible for both the Generating and Energy Services Division. Walter M. Higgins is now senior vice president-Generating Division, and Donald E. Lengacher is senior vice president-Energy Services Division. CD Hobbs was named senior vice president and chief financial officer of PGE and Portland General.

Iowa Power appoints Vorbrich president

Lynn K. Vorbrich was appointed president and chief operating officer of Iowa Power and Light Co. He succeeds the retiring Dwight H. Swanson, who was named director emeritus of Iowa Resources Inc.

Casazza honored for T&D contributions

The Institute of Electrical and Electronics Engineers has presented its 1990 Herman Halperin Electric Transmission and Distribution Award to John A. Casazza, president of Casazza, Schultz & Associates Inc. IEEE recognized Casazza for his leadership in, and contributions to, the development and reliable utilization of electric power transmission systems. Casazza, who previously served as vice president of research and planning at Public Service Electric & Gas Co., has over 40 years of experience in transmission system development and use, transmission cost allocation and transmission contracts.

EEI awards utilities for consumer programs

The Edison Electric Institute said it presented five electric utilities with its Common Goals Award for their outstanding consumer programs. The winners were: Arkansas Power & Light Co., Alabama Power Co., Wisconsin Electric Power Co., Puget Sound Power & Light Co., and Pennsylvania Electric Co. Utilities given Special Distinction awards include: Public Service Electric & Gas Co., Northern States Power Co., Potomac Electric Power Co., Southern California Edison Co., Atlantic Electric Co. and Pennsylvania Power & Light Co. The winners were selected from a field of 97 entries, according to EEI.

Safety training offered

The Crane Inspection & Certification Bureau (CICB) has announced its safety training schedule for November 1989 through February 1990. CICB training courses include: mobile cranes and rigging considerations; overhead hoists; supervisor awareness; tower cranes; manbaskets; mobile crane operation; aerial lifts, and more. For more information contact CICB, 5874 S. Semoran Blvd., Orlando, FL 32822; or call (800) 327-1386; in Florida call (407) 277-0884.

ASME boiler code is recognized as landmark

The American Society of Mechanical Engineers Boiler and Pressure Vessel Code has been designated as an international historic mechanical engineering landmark. The boiler code, published for 75 years, is an American national standard that affects boilers and other pressure vessels, according to ASME. The organization said the code is revised and published every three years with interim addenda to update information.

OPPD, Westinghouse contract for fuel supply

The Omaha Public Power District has chosen Westinghouse Electric Corp. to supply fuel fabrication for its Fort Calhoun Station. Westinghouse said its commercial nuclear fuel division will supply three regions of fuel starting in August 1991. The contract will fulfill Fort Calhoun's fuel requirements through 1996, according to the company.

Utilities fined by NRC

The Nuclear Regulatory Commission recently proposed the following fines:

AZ Nuclear Power Project

A $250,000 fine for alleged violations of NRC requirements involving preventive and corrective actions, operator training and procedures, and emergency lighting at the Palo Verde Nuclear Generating Station.

Florida Power Corp.

A $100,000 fine for alleged violation of NRC requirements related to environmental qualification of electrical equipment at the Crystal River nuclear power plant.

So. Carolina Electric & Gas

A $25,000 civil penalty for alleged noncompliance with Federal requirements by the use of an unauthorized operator in the control room of the V.C. Summer nuclear power plant.

New York Power Authority

A $50,000 fine for alleged failure to comply with NRC requirements for the physical protection of the Indian Point Unit 3 nuclear plant.

Northeast Nuclear Energy

A $25,000 fine for alleged violations of NRC requirements for the safe handling and shipment of equipment used to decontaminate the Unit 1 reactor cavity at the Millstone Nuclear Generating Station.

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Line crews, other resources sent for Hugo cleanup

Mark T. Hoske
News Editor

Hugo—the nation's tenth most severe recorded hurricane—will require cleanup and repairs to electrical systems well into November.

It left more than a half million customers without electrical service, some for periods of more than two weeks. Total damages, cost of repairs and lost revenue for electrical systems alone could exceed half a billion dollars. Utilities in at least a dozen states helped with the restoration and cleanup effort.

Line technicians were spared the trouble of restoring power to much of the South Carolina beach-front property, which washed away.

More than half the buildings on the U.S. Virgin Islands of St. Croix and St. Thomas were damaged. On Puerto Rico, 30,000 people were left homeless. Electrical system damage on Puerto Rico was estimated at $20 million, said Public Power Weekly.

More than 400,000 people in South Carolina were left without electric service after hurricane Hugo's 135-mph winds snapped transmission and distribution poles, devastated substations and damaged some generating facilities Sept. 21-22. Hugo took 34 lives on the mainland. At least two people died in the restoration effort.

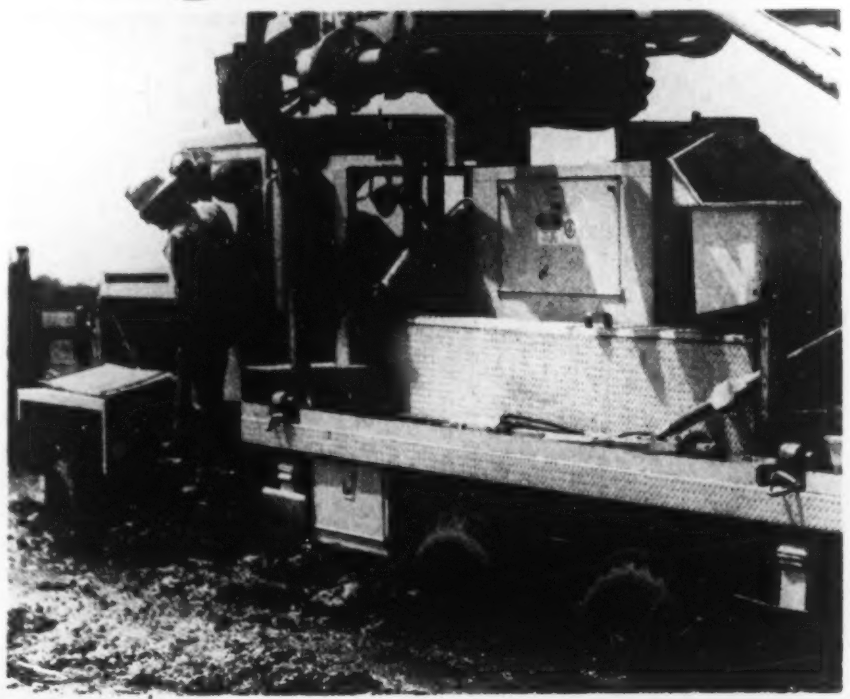
The federal government set aside $1 billion for disaster aid. A sampling of the devastation and related difficulties can be seen in the Carolina Power and Light Co. photographs.

Mainland damage was most severe in and around Charleston, served by South Carolina Electric and Gas Co. Nearby Santee Cooper, Carolina Power & Light Co., Duke Power Co., also sustained severe damage.

Other utility systems in Florida, Georgia, the Carolinas and Virginia

Continued on page 7

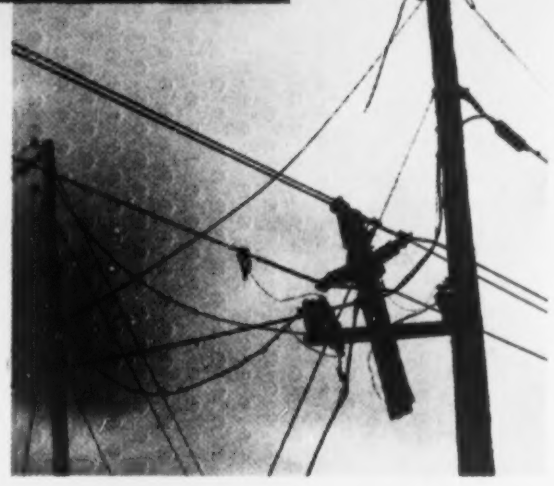
At left, a Santee Cooper distribution transformer and a three-wire service line lay entangled on the ground near Moncks Corner, SC, with uprooted and snapped trees, showing Hugo's destructive force. A CP&L employee took this photograph on the way to Charleston.



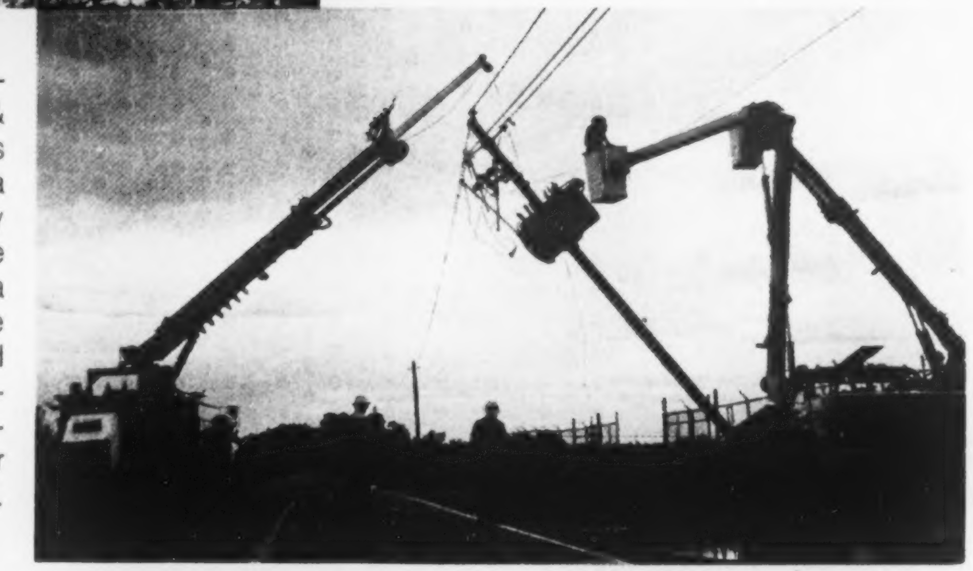
Below, a brick house survives, but not the nearby transformer, pole and lines.

At left (center) CP&L transmission line crews near Sumter, SC, wallow through mud left by torrential rains that accompanied Hugo. The crews are replacing some of the 198 transmission structures taken out by Hugo. Fragments of wood poles litter the scene. Above, a transmission maintenence truck, buried past its axles, is towed by a tracked vehicle. Initially, even travel by road was difficult, because of the thousands of downed trees and debris.

At right, the top of a junction pole—a three-phase line with a two-phase tap—hangs suspended near Hartsville, SC.



At right, Carolina Power & Light crews work on a dangerously leaning pole that holds a three-phase circuit and three 100-kVA transformers, near Florence, SC.



Purchasing management faces fewer market choices

Richard J. Metzler
James R. Blomberg
Richard Metzler & Associates

NORTHBROOK, IL—Utility purchasing management will face longer delivery times and firmer prices in the coming years as a result of reduced manufacturing capacity, narrowed product lines and fewer owners.

Those changes, combined with an expected upturn in utility spending, are shifting economic leverage from the buyer to the seller in the utility marketplace.

Utility purchasing management is now challenged to implement proactive methods and programs to keep pace with continuing market changes.

Over the past 15 years, sluggish utility spending for transmission and distribution facilities and equipment has severely taxed suppliers and their ability to survive. The downturn in generation construction expenditures since 1982 also has strained the financial performance of related manufacturers.

To protect themselves from market forces and position themselves to serve future market opportunities, utility suppliers have undergone an extensive restructuring. The net effects are reduced supplier manufacturing capacity, narrowed product lines and alternatives, fewer supplier companies and competitors.

Since 1980, construction spending for transmission equipment has first flattened and then declined, moving from $2.35 billion in 1980, to $2.25 billion in 1985, to $2.07 billion in 1987.

Look for the results of a survey on the future of purchasing in an upcoming issue.

Distribution spending remained flat from 1980 through 1983. Then it grew in the double digits, tied to the mid-1980's residential construction boom and fell off as construction slowed. If the effects of inflation are also considered, unit volumes have probably declined overall.

At the same time, a more dramatic decline occurred for generation construction spending. Spending peaked at $25.3 billion in 1982 from $19.2 billion in 1980, and then dropped to $14.4 billion in 1987.

This pattern is a direct result of the decline in nuclear activity (no new plants have been ordered since 1973 without being cancelled) and steam orders. It also is a function of the regulatory and legislative environment.

Furthermore, a significant portion of the dollars classified as generation are noncapacity equipment such as scrubbers and other environmental protection equipment. The net result has been a substantial drop in capacity shipments since 1980.

These constraints on domestic demand have driven suppliers to restructure, hedging their positions against market forces and strengthening their financial base. Essentially, suppliers have moved in four directions:

- Traditional suppliers have withdrawn from selected product lines.
- Entire companies, as well as product lines, have been acquired by other participants.
- Alliances have been created through

Continued on page 4

Capacity Additions, 1989-2000

Plant Type	Gigawatts
Electric Utilities	
Planned	37
Unplanned	
Coal-fired Steam	21
Combined Cycle	36
Combustion Turbine	16
Total Unplanned	73
Total Electric Utilities	110
Non-utilities	27

Source: Energy Information Administration, 6/89.

Sample of Supplier Industry Restructuring, 1984-89

Year	Activity	Products Affected
1984	Cablec Acquired Phelps-Dodge Cable & Wire	Cable & Wire
1985	Cablec Acquired Anaconda-Ericsson C&W Business	Cable & Wire
1985	Cablec Acquired Essex C&W from United Technologies	Cable & Wire
1985	Cooper Industries Acquired McGraw-Edison	T&D
1985	Westinghouse Licensed Marketing Rights to Mitsubishi	EHV Circuit Breakers
1987	ASEA (Sweden) Merged with Brown-Boveri (Swiss)	Generation, T&D
1987	Westinghouse Acquired GE's Transformer Business	Transformers
1988	ABB Partnered with Babcock and Wilcox	Pressurized Fluid Bed Combustion
1988	Cablec Acquired Continental C&W from Anaconda-Ericsson	Cable & Wire
1988	Cablec Acquired Collyer Insulated Wire	Cable & Wire
1988	Combustion Engineering Joint Ventured with Alsthom (FR)	Generation
1988	Cooper Industries Acquired RTE	Transformers
1988	General Electric Joint Ventured with GEC (U.K.)	Distribution
1988	General Electric Joint Ventured with GEC and CGE (FR)	Gas Turbines
1988	Pirelli Acquired General Cable	Cable & Wire
1988	Westinghouse Joint Ventured with ABB	T&D
1989	Cablec Acquired BRIntec	Cable & Wire

COMMENTARY

Who should decide how air should be cleaned up?

The electic utility industry will have a new set of Clean Air regulations to live by before the end of 1990. Few argue this point. There is almost total agreement of the many interested factions that we *will* mount a new campaign to clean up the air we breathe, beginning in 1990.

Who would argue against cleaner air? Everyone I know is in favor of some sort of improved (whatever that means) Clean Air regulations. But I get a bit fearful when I begin to think of what that could mean...first, for the general public, and second, for the electric utility industry.

There's a tendency to oversimplify the problem of regulating pollution of the air. Utilities are very visible...and their plants do put a substantial amount of visible material into the air. It always has been easy to focus on utilities as the bad guys...the ones in the black hats...who ought to be made to clean up their acts.

I wouldn't argue that a number of utilities have plants that are culprits in the fight for clean air. But many utilities have plants that are advancing clean-air technology. In fact, over the years since the environment became something to work for, rather than simply exist in, utilities have led American industry's efforts. They have recognized their corporate citizenship roles and their responsibilities to reduce hazardous stack emissions.

For example, from 1973 through 1987, utilities increased their use of coal for generation by more than 87 percent. At the same time, they reduced their release of SO_2 by more than 21 percent. During the same period, most other industrial entities did little, or nothing.

But as things stand now, utilities would be penalized for what they have done in the past. The current proposals would put caps on emissions and plant capacity factors. They would affect different types of plants in different ways, but generally would reduce effective use of existing facilities. It would penalize most those facilities that have been operating in environmentally responsible ways.

Over the next 20 years, consumers would be called upon to pay $120 billion—an average of $6 billion per year—in added cost for their electricity if the administration's proposals pass, according to industry estimates. In fact, Deputy Secretary of Energy W. Henson Moore recently told the Governing Board and Management Committee of the International Energy Agency that the cost will rise to $28-$38 billion in that period.

There are a lot of problems with the administration's package. Perhaps the largest is that our government can't resist the opportunity to practice one-upsmanship with the industries it proposes to legislate. Look at what's been done for the American farmer—specific programs paid farmers not to raise certain crops, yet we have over-surpluses of some commodities, farmer bankruptcies and destruction of the American family farm economy.

Or the food and drug industry, where our passion for a no-risk society requires infinite time and carloads of statistical data for the FDA to assess the safety and probability of a product's safety, forcing eventual costs into the stratosphere, and reducing R&D that otherwise might benefit humanity.

Or the nuclear industry, where regulations have become so specific and so cumbersome...measured in thousands of pages...that even computers are hard-pressed to keep up with them and mere humans are almost totally lacking in the ability.

Why can't the government...Congress and the Federal departmental bureaucracy...set up goals and let the respective industries figure out how to best meet those goals. Why not set up incentives for achievement and penalties for failure. Instead, they specify what is to be done, then, and in detail, proceed to tell the doers, the real experts, how to do it, despite knowing little or nothing about the subject or process under consideration.

How much better, in the case of the Clean Air proposals specifically, if they would work with those who seek a cleaner environment and those that must actually provide it to determine realistic and practical goals, then let the regulated be left the task of complying.

Given a flexible regulatory mandate, utilities of all types could find optimum ways to meet the goals and save their customers...the consumers who ultimately must pay for anything they receive (whether or not they want it)...substantial amounts of money. Projected savings of 20-30 percent make consideration of alternatives to the administration's proposals worth fighting for.

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from page 3

Purchasing management choices...

joint ventures, licensing and marketing arrangements.

- Foreign sources (particularly European) have linked with U.S. suppliers.

A recent Salomon Brothers report illustrates the effects of restructuring. It cited a cut in generation supplier manufacturing capacity of 50 percent since 1975, to a level of about 12,000-15,000 MW annually. Furthermore, the remaining participants are currently operating at 20 to 30 percent of this reduced level.

Other effects are the consolidation, partnering, and globalization of industry participants. This activity has reduced the number of available suppliers, but strengthened the financial and /or product base of those remaining.

Spending rebound

Looking ahead, spending by U.S. electric utility organizations for new plants and facilities is projected at $128.7 billion for the five years, 1989-93 (*EL&P*, Jan., p.1), a 5.9-percent increase over previous projections for the five years, 1988-92. This suggested uptrend is also illustrated by Energy Information Administration's recent projection that 110 GW of new generating capacity will be needed by the year 2000.

The combination of supplier restructuring and rebounding utility spending has shifted economic leverage from buyer to seller.

Delivery times are increasing: In the middle of last summer's record heat, transformer delivery times more than doubled, from 12 to 26 weeks, an increase attributed to the abandonment, consolidation and downsizing of product lines.

So far, prices have not been impacted beyond the normally scheduled increases. But as the market tightens, prices can be expected to rise beyond historical rates in the next six to 18 months.

Similarly, given the industry's needs for new generating capacity, an order boom is very likely to start in the next several years. However, with supplier capacity limitations, utilities can almost certainly count on more lengthy delivery times, if not significantly higher prices. As these trends intensify, the demands on purchasing management will also grow.

Requirements for success

These growing challenges can be met successfully in four ways.

First, purchasing management must recognize its changing environment, confront the resultant issues, and communicate its evolving position to utility management and all constituent organizations. As the industry restructures, from both a supplier and utility viewpoint, new forces will impact the purchasing function. Without recognizing these changes and communicating within its organization, purchasing management will be ill-equipped to meet both departmental and overall utility objectives.

Second, to ensure that shareholder and ratepayer goals are met, utilities must become more active in working with suppliers to define and develop future product/service requirements.

Purchasing management must become more involved with evaluators and specifiers, and work as both a partner and a conduit to communicate with suppliers.

This will provide two benefits: more timely coordination, incorporation, and implementation of evolving requirements into the utility plant, and greater supplier commitment to supporting utility operations.

Third, material requirements planning will take on heightened importance as lead times increase and the number of suppliers shrinks. More stringent, detailed forecasting is required to ensure that the proper mix and level of inventories are on hand.

The purchasing response must be a combination of advance ordering to guarantee a delivery interval and firm price, and an increase in the safety stock of critical inventories to guard against shortages and long lead times.

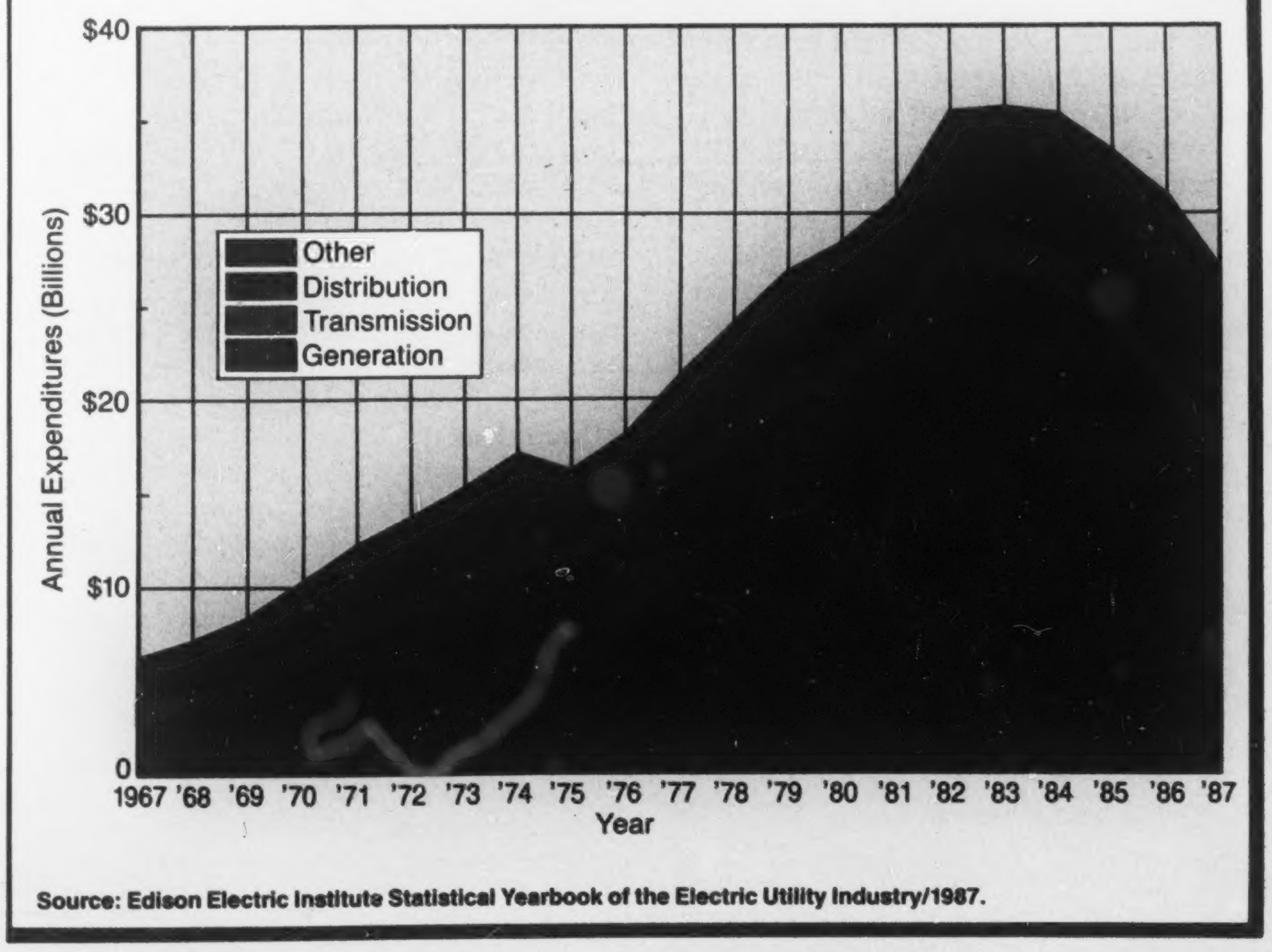
Fourth, purchasing management must develop a purchasing operations plan incorporating the evolving product/service requirements of the utility, along with a recognition of the increased complexity of the supplier environment.

This plan should include a review of potential software and system enhancements, increased emphasis on data analysis, establishment of a purchasing research function, and the required staffing levels for support.

Development of this plan will validate existing objectives and processes, as well as develop enhanced methods to meet its primary objective: maximizing spending efficiency and minimizing operational risk.

The purchasing function is exposed to the structural and economic changes in the electric utility industry. Purchasing management must take the proactive steps required to stay ahead of these changes to further the interests of its department and utility.

IOU Construction Expenditures, 1967-87



Source: Edison Electric Institute Statistical Yearbook of the Electric Utility Industry/1987.

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DECEMBER 1989

ELECTRIC LIGHT & POWER

EL&P

Volume 67, Number 12
A PENNWELL PUBLICATION

VOICE OF THE ELECTRIC UTILITY INDUSTRY

LATE NEWS

Creditors' and stockholders' representatives agreed to Northeast Utilities' boosted $2.3-billion offer for Public Service Co. of New Hampshire (see p.3). Final approval would be needed from state lawmakers, creditors, stockholders, and PSNH bankruptcy court. See also p.13.

PWCC weighs options. See below.

ABB buys C-E, see p.13.

PacifiCorp thinks bigger, offers $2B for Arizona PS

PORTLAND, OR—PacifiCorp offered Pinnacle West Capital Corp. (PWCC) $1.7 billion in cash Nov. 8 for all the common stock of its wholly owned electric utility subsidiary Arizona Public Service Co. A stock exchange for preferred shares raises the offer to $2.08 billion.

The offer, if accepted and approved—two very large "ifs"—would create a utility with commanding control of transmission resources in the West.

PWCC, financially burdened with cash-hungry subsidiaries, including MeraBank thrift, immediately acknowledged the offer, but refused additional comment. Book value of APS is $1.95 billion. PWCC's Nov. 7 stock value was $824 million, according to *The Wall Street Journal.* (See p.12 for PWCC's dismal third-quarter results.)

Diversified PacifiCorp won approval for a merger with Utah Power & Light Co. Jan. 9, after 17 months. During interviews with EL&P for the 21st Utility of the Year award (Nov., p.1), executives said they wouldn't rule out another merger opportunity.

"Combining the electric operations of PacifiCorp with APS will produce the substantial savings that are necessary to contain electric prices for APS electric customers," said A.M. Gleason, PacifiCorp president and CEO.

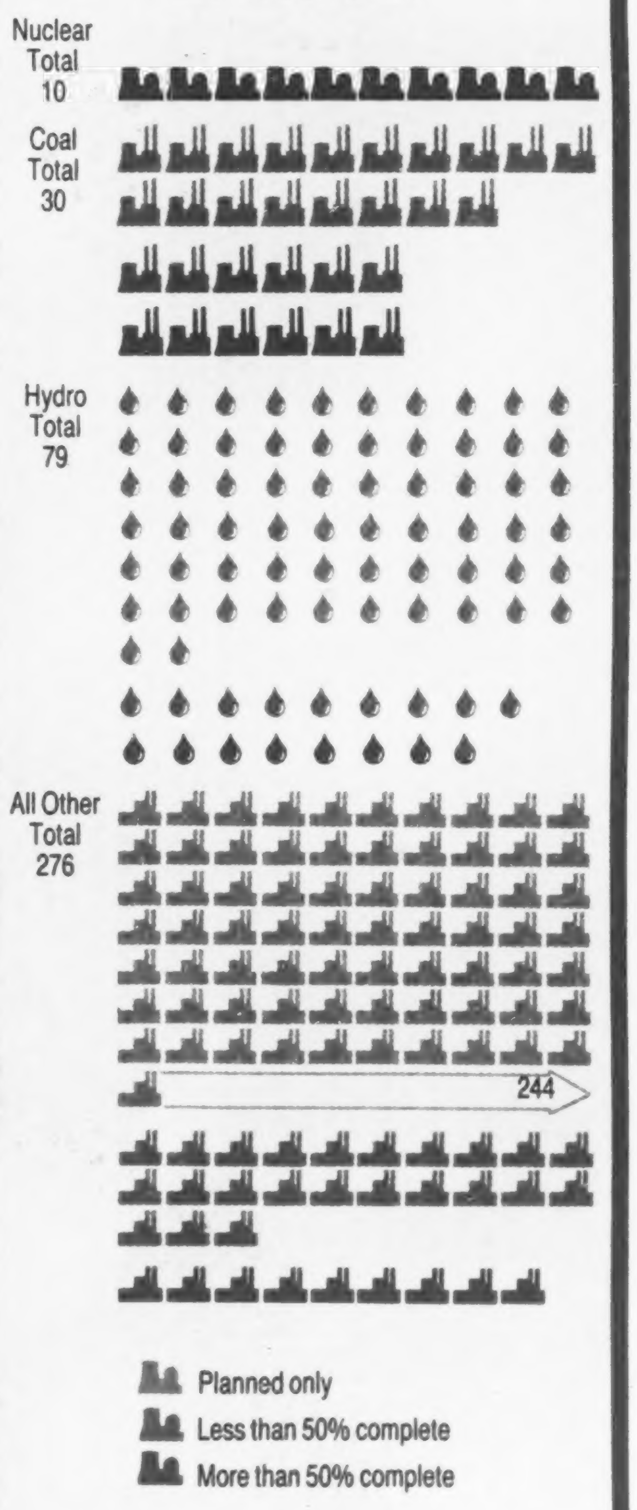
The benefits would offset rate increases resulting from APS investments in generation, he said. Seasonal demand advantages would reduce the need for future resource additions for both companies.

APS would retain some autonomy

APS would become part of PacifiCorp Electric Operations, along with Pacific Power and Utah Power, Gleason said. APS would also continue to operate from Phoenix with its own officers, as well as a board that would include directors selected from existing APS members and communities. APS would be represented on PacifiCorp's board.

The offer proposed that APS preferred stock be exchanged for equivalent preferred PacifiCorp stock or cash and that APS first mortgage bonds remain outstanding and secured by its properties.

STATUS OF NEW GENERATING STATIONS IN THE U.S.



Source: NERC 1989 Reliability Assessment

FPL wins more than Deming quality prize

MIAMI—Florida Power & Light Co. won the Japanese Deming Prize for Quality Control. More than that, because of the 18-month application process, FPL increased efficiency and cut complaints.

First non-Japanese firm to win

FPL, the main subsidiary of FPL Group Inc., is the first non-Japanese firm to apply for—and the first to win—the prize since international firms were invited to participate in 1984.

Robert E. Tallon, FPL president, explained that achievements at FPL included:

- Reduced average length of customer service interruptions from 100 minutes in 1982 to 48 minutes in 1989.
- Reduced fossil power-plant outage rate from 14 percent in 1986 to less than 4 percent in 1989, saving ratepayers an estimated $300 million in avoided cost for new generation.
- Lowered customer complaints to the Florida Public Service Commission to the fewest in 10 years.

The Union of Japanese Scientists and Engineers created the prize in 1951 to honor American quality pioneer W. Edwards Deming.

June drill helped quake recovery

SAN FRANCISCO—On June 2, 100 Pacific Gas & Electric Co.'s managers responded to an earthquake. On Oct. 17 the Bay Area responded.

June's "quake," a drill with characteristics nearly like the deadly Oct. 17 actual quake, may have saved lives.

"The training that climaxed with our June emergency exercise paid huge dividends when we confronted the impact of the real thing on October 17," said Richard A. Clarke, PG&E chairman and chief executive officer.

In fact, the drill anticipated more destruction (*EL&P,* Oct., p. 18).

"Our gas and electric systems both came through the quake in excellent shape—better than in the June scenario," Clarke said. "The underlying strength of the system, together with our employees' skills, fine training, and great spirit, enabled us to return to near-normal operating conditions quickly."

The earthquake, originally put at 6.9 on the Richter scale, was upgraded to 7.0. Immediately after it hit, an Emergency Operations Center was set up as a central meeting place for officers and managers.

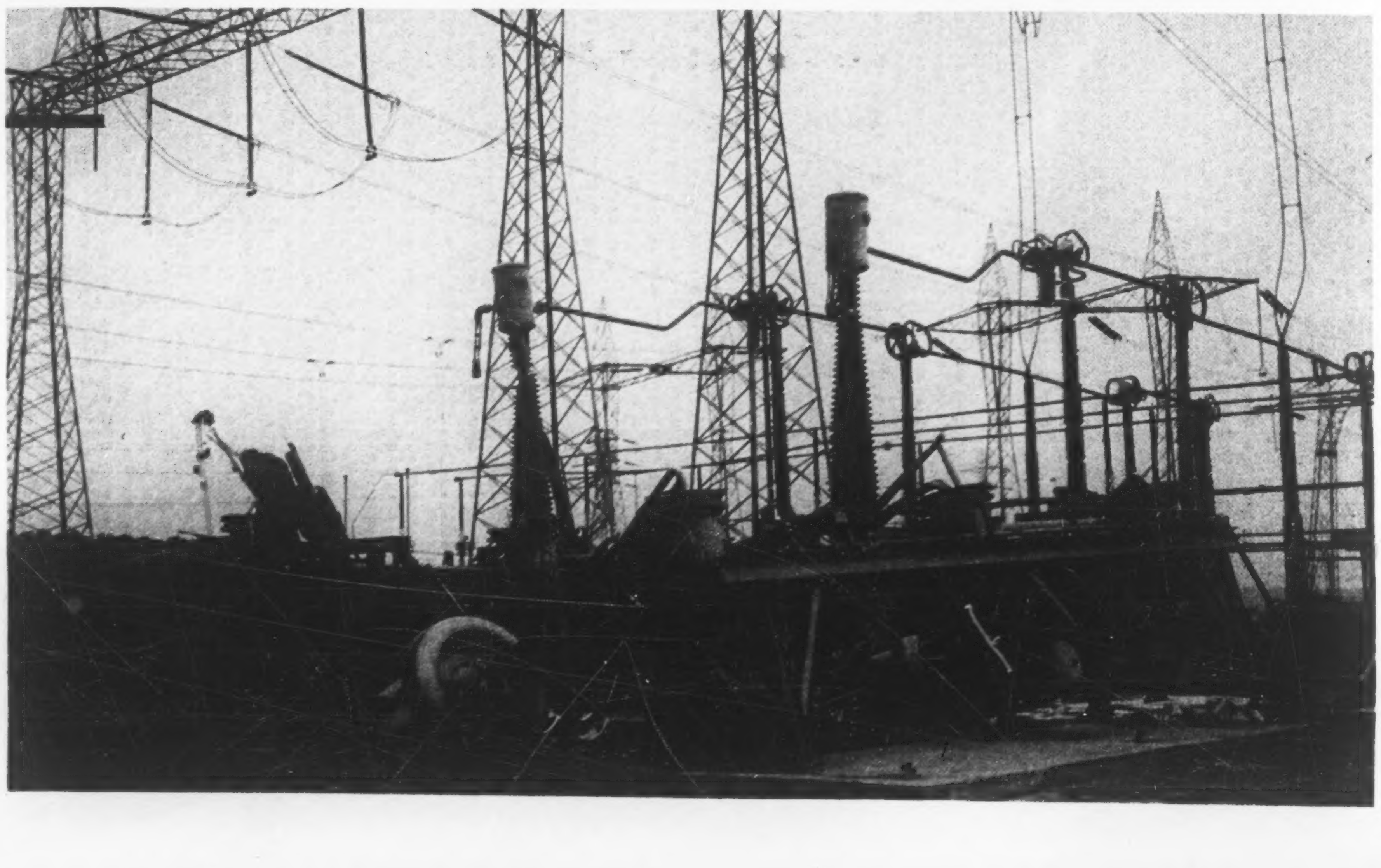
PG&E estimated damages near $100 million on Oct. 21, but officials said exact figures would take more time.

The 750-MW Moss Landing Unit 6, which is natural gas-fired, sustained damage. Its switchyard is shown below and on page 14.

A 217-MW Potrero unit, supplying much of the city, tripped off with the quake. The Navy's USS Lang docked at Pier 70 near the plant and rigged hoses

Continued on page 14

This PG&E 500-kV switchyard at Moss Landing was devastated by the Oct. 17 earthquake. The 500-kV yard at Metcalf was also heavily damaged as was the San Mateo Substation. Those helping area utilities included San Diego Gas & Electric, Southern California Gas & Electric, Western Area Power Administration, the Department of Energy, Sierra Pacific, Southwest Gas and



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NEWS BRIEFS

JILL MINNER, Special Projects Editor

CILCORP acquisition adds to environmental service operations

CILCORP Inc. has signed a definitive agreement to acquire the stock of Hunter Environmental Services Inc.'s environmental consulting and analytical service businesses. According to CILCORP, parent company of Central Illinois Light Co., the acquisition will add about 750 professionals and 150 support personnel to its existing environmental service operations.

FERC sets ROR

The Federal Energy Regulatory Commission set its quarterly benchmark rate of return for electric utilities at 12.04 percent. According to the commission, the benchmark rate of return applies to rate filings made by jurisdictional electric utilities between Nov. 1, 1989 and Jan. 31, 1990.

Idaho Power is nearing loads, resource balance

Idaho Power Vice President for Power Supply Jan Packwood said the utility is nearing the time when its average generating capability will equal its firm energy delivery obligations. Since Idaho Power implemented new energy sales agreements with Sierra Pacific Power Co. and UAMPS, the company has been approaching loads and resource balance, while retaining some existing surplus generating capacity for its own system, according to Packwood. Currently, the utility said it is only interested in mid-term sales opportunities shaped around its seasonal energy surpluses. "During at least the next decade, we believe we'll be able to meet our energy obligations with improved efficiencies at existing power plants, conservation programs and cogeneration and small hydro purchases," stated Packwood.

NRC issues report on NU's Millstone 1 and 2

After making its Systematic Assessment of Licensee Performance at Northeast Utilities' Millstone Units 1 and 2, the Nuclear Regulatory Commission found that worker morale is generally high and that management has an aggressive attitude toward safety. The commission's report also revealed that, "a substantial majority of employees felt their concerns were adequately addressed through existing systems, including discussion with their supervisors." Both nuclear units earned high marks in meeting performance requirements according to the NRC. The inspection was conducted from Jan. 1, 1988 to June 15, 1989, and included a confidential survey of Millstone employees to evaluate the credibility of the company's Employee Concerns Program.

Minnesota Power, NSP settle contract dispute

Minnesota Power said it has settled out of court with Northern States Power Co. regarding a disagreement over the validity of a 1986 contract between the two companies. The contract provided for NSP's purchase of a 40-percent interest in Minnesota Power's Clay Boswell Generating Unit 4. The companies have agreed to void the original contract and establish a new one. Under the new agreement, NSP will purchase 200 MW of peak load electricity from Minnesota Power between May 1990 and October 1993.

NRC proposes revisions for licensing of radwaste repository

The Nuclear Regulatory Commission has proposed amendments to its regulations for licensing the Department of Energy's construction and operation of a high-level radioactive waste repository. Some of the proposed revisions relate to procedures for the admission of initial and late-filed contentions. Other revisions include: requiring a party sponsoring a contention to present direct testimony and not to rely solely on cross examination to prove its case; making mandatory the entire hearing schedule set forth in a model hearing schedule; and prohibiting the NRC's Licensing Board or Appeal Board from raising issues which have not been placed in controversy by the parties involved in the proceeding.

Braun appointed ANS executive director

The American Nuclear Society has named Joseph C. Braun executive director. Braun will take over the position on Jan. 1, 1990, replacing Octave Du Temple who has served as executive director for 32 years. According to ANS, Braun has 25 years experience in the nuclear industry, and worked most recently for Combustion Engineering as director, reactor technical baseline program.

Former SW Bell head takes over at KPL Gas

KPL Gas Service announced the appointment of John E. Hayes Jr. as its chairman, president and chief executive officer. Hayes, who resigned last January as chairman, president and chief executive officer of Southwestern Bell Telephone Co., succeeds David S. Black who retired in September. William E. Brown had served as interim president since Black's retirement.

Gressette to be SCANA chairman, pres. & CEO

Lawrence M. Gressette Jr. has been chosen as SCANA Corp.'s chairman, president and chief executive officer, as well as chairman and chief executive officer of all SCANA subsidiaries, effective Feb. 1, 1990. Gressette has served as president and treasurer of SCANA Corp. and vice chairman of SCE&G. John A. Warren, who will retire as chairman and chief executive officer Jan. 31, will continue as a member of the board and as chairman of the executive committee.

New president named at Dominion Energy

Tyndall L. Baucom succeeded the retiring Ronald H. Leasburg as president of Dominion Energy, the independent power subsidiary of Dominion Resources. Baucom was previously president of Dominion Lands, and served as vice president responsible for fossil and hydro operations at Virginia Power. Leasburg will serve as a consultant to Dominion Capital in connection with the development of a major hydroelectric plant in Louisiana.

New Hampshire Yankee president responds to NRC violation notice

New Hampshire Yankee President Edward A. Brown recently responded to the U.S. Nuclear Regulatory Commission's Notice of Violation regarding the circumstances surrounding the shutdown of Seabrook Station's reactor on June 22, 1989. The commission issued a violation and assessed a $50,000 civil penalty against New Hampshire Yankee. In response Brown said that, "The findings contained in the NRC's report are consistent with our own review, and we accept them. We intend to pay the civil penalty without delay." But in order to put the situation in perspective, Brown also stressed two points that the NRC made in its notice. The commission stated that, "reactor plant safety was never in question," and that the violation and civil penalty were issued "to emphasize the importance of maintaining the necessary attention to, and control and oversight of, activities at your facility."

GMP wins top award for 1988 annual report

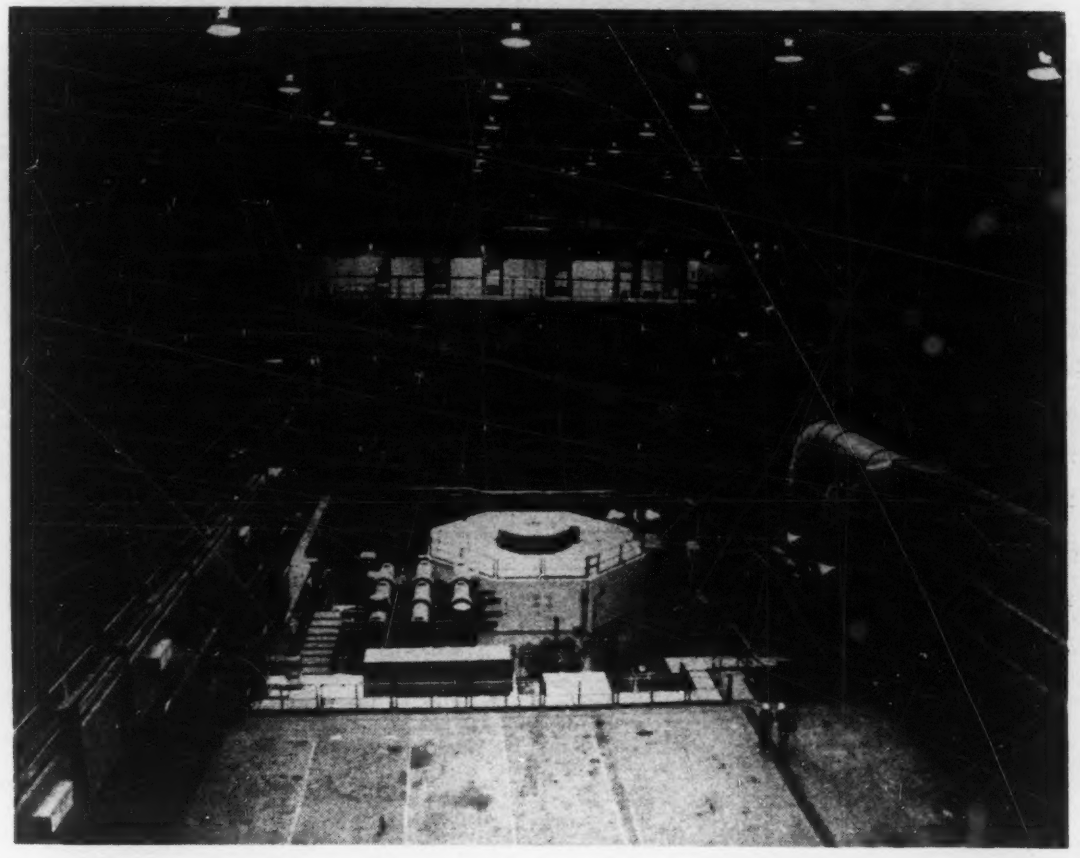
Green Mountain Power Corp. said it received *Financial World* magazine's Bronze Award for annual reports produced by U.S. electric, telephone and gas utilities with less than $1 billion in assets. Over 1200 companies entered their 1988 annual reports in the competition, GMP said.

Utilities fined by NRC

The U.S. Nuclear Regulatory Commission recently proposed the following fines:

Northern States Power Co. A $25,000 fine for use of commercial grade equipment at the Prairie Island Nuclear Power Station without determining its adequacy for use in safety systems.

SoCalEd hydro project wins engineering award



Southern California Edison Co. announced that its Balsam Meadow hydroelectric project has been honored by the American Society of Civil Engineers with California's 1989 Outstanding Civil Engineering Achievement Award. According to the utility, the award is given for "the engineering project that demonstrates the greatest engineering skills and represents the greatest contribution to civil engineering, progress and mankind." Construction of the Balsam Meadow plant, the newest addition to SoCalEd's Big Creek hydroelectric system, involved blasting four miles of tunnels through solid granite and excavating a cavern 1000 ft below ground to house a 200-MW power station.

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COMMENTARY

Selling off America's productive capacity

Commitment. It's a word that has been the cornerstone of electric service for decades. It's what has produced the most abundant, reliable and low-cost electric power supply system in the world. It's what makes utility managements swallow cost increases as long as possible before seeking rate relief. It's what puts linemen up on poles and in bucket trucks during the worst of storms. It's what led Midwest, Southern and Northeastern utilities to send work crews to South Carolina, where they worked around the clock to help restore power after Hurricane Hugo.

Commitment also is a word that has come to have less and less meaning to the managements of many of the suppliers to electric utilities. Far too many company managements no longer are in business to make quality apparatus. Rather they're in business only to make money. And if those managements aren't good enough to make and market equipment at a profit, then the easier fix is to make a deal for shareholders and sell out.

During the past few years, there have been many potential buyers waiting in the wings. Many of these are foreign companies, waiting for a chance to buy into the American market at bargain prices. The opportunities have been numerous. Many managements of industry suppliers have been leaders in the sellout of American productive capacity and technology...to foreign organizations...some even while denying that possibility.

For example, two years ago, I received an immediate response from Westinghouse Electric Corp. after I ran an editorial in which I mentioned how a number of U.S. suppliers to the industry were downsizing operations or selling them off to foreign interests. Westinghouse T&D executives insisted that Circle-W was committed to the American electric utility industry. They insisted that I visit a series of Westinghouse facilities to observe that commitment firsthand. I visited, I saw and I was impressed with what appeared to be *deep* commitment. But just a few months later, Westinghouse announced it was entering into joint ventures with Asea Brown Boveri in both T&D and generation (the latter subsequently was killed off by the government because of potential anti-competitive issues). But there were options in the 50-50 joint venture under which ABB could buy Westinghouse's interest. It was clear from the beginning, although not officially confirmed until last April, that the Westinghouse-ABB name was merely a short-term convenience; ABB would be the successor company. Since Westinghouse had gotten rid of several other T&D product lines earlier, by next January Westinghouse will effectively be out of the T&D business.

Please don't misunderstand. I *understand* foreign companies wanting to buy their way into the U.S. utility market. Moreover, I have been impressed by ABB for some time. The commitment of Percy Barnevik, ABB chairman, to the electric utility industry worldwide is apparent in the way the company is managed and the way its people operate. I can think of no other offshore supplier management, and very few domestic managements, that I would rank as high in terms of ethics and principles, or in terms of dedication to quality, performance of its products and development of new technology. In fact, the growing presence of ABB in the U.S., including the recently announced Combustion Engineering acquisition, may well have a strong positive influence on the entire electric utility apparatus market.

I'm just saddened that our own American managements haven't been capable of adjusting to today's market realities and remaining viable.

Season's Greetings to all

As the year draws to a close, *Electric Light & Power's* editors would like to thank all our readers for their loyalty in the past year and our advertisers for their support. You've all helped *EL&P* close out the decade on a high note, with the best readership and highest advertising revenues in our history. We're all deeply appreciative and promise we will do everything in our power to make 1990 even better.

Robert A. Lincicome, Editor-in-Chief

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LETTERS

Offshore cooperation is suspect

I read with great interest your recent article (Oct., p.1) on DOE funding of advanced reactor design, particularly the discussion of the GE Simplified Boiling Water Reactor (SBWR). Included in the list of participants in the SBWR project, which will be funded by DOE, were Hitachi and Toshiba of Japan, Ansaldo of Italy and KEMA/NUCON of the Netherlands. Based on past occurrences and common sense, I say it is probable that these foreign companies will absorb as much of the SBWR technology as possible and strive to develop it into a marketable product, which will likely end up being marketed to utilities in the United States.

I'm sure there are many reasons why the United States is not maintaining its international competitiveness, but it sure doesn't help when we fund technology development for overseas companies, which they then sell back to us. It would be in the long-term interests of General Electric and the USA if foreign companies were to be excluded from technology development funded by the U.S. taxpayer.

William C. Moore
Evans, GA

Surge protection no joke

We were astonished to read in your October edition, (p.4) the letter by Mr. Dennis M. Zogbi, in which he dismisses the surge protection industry as "a big joke" and implies that the industry has conned the public into buying products that do not work.

While we would be the first to admit that there have been a significant number of shady practitioners in the surge protection business (such as those claiming to reduce your utility bill), our experience has been that the large companies are honest and market products which perform as advertised.

We do not know where Mr. Zogbi received his education in the finer points of common sense, but it clearly did not include much about the physics of lightning or transient overvoltages.

Lightning is considered for all practical purposes to be a current, not a voltage source. The typical lightning strike delivers one or more current pulses, which typically have 20,000 to 100,000 amperes peak current, a risetime of a few microseconds and a duration of up to 100 microseconds.

Little of this surge current finds its way inside a building, even when lightning stikes the building itself or the power line very close to it. Surge current measurements on lightning arresters on overhead distribution lines rarely show currents over 10 or 20 kA. These values probably represent the limits of surge currents likely to be seen at the service entrance.

Furthermore, the low insulation strength of low-voltage wiring restricts surge voltages (and hence currents) through flashover. It is very difficult to drive lightning currents of more than 5 kA or so into building wiring, data or telecommunications circuits. This was the reason that the ANSI Standard C.62.41-1980 adopted an impulse current of 3 kA, 8x20 microseconds as typical of the indoor environment beyond the service entrance.

Hybrid surge suppression circuits containing MOVs, gas tubes, silicon avalanche diodes and other linear and non-linear circuit components can, and do, protect computers and sensitive electronic equipment from surges of this magnitude.

We at EFI Electronics Corporation not only demonstrate the capability of our surge suppressors to protect sensitive equipment from surges, including lightning, but we also warrant that they will do so, and will pay for repairs to protected equipment if they do not.

It may not make sense to Mr. Zogbi that the little box under the desk will protect his computer against lightning surges, but if he would like to visit our laboratory, we will show him how we do it! We further invite him to examine the many letters written by our customers, who have lost every electronic device in their facility, except those protected by the so-called "big joke" TVSS devices.

Meanwhile, perhaps Mr. Zogbi would like to confine his remarks to areas within his field of expertise. His superficial comments on surge suppression make us question the credibility of his market survey of the industry.

Michael F. Stringfellow, Ph.D., P.E.
Director of Research
and
David A. Bell, Ph.D., P.E.
Vice President of Research
EFI Corp.
Salt Lake City, UT

WP&L's transmission access program

I was dismayed to learn that *EL&P* had taken its "hat off" to Wisconsin Power & Light Company for becoming "the first utility in the country to announce that it is actively seeking permission from the FERC to make its transmission system available to any and all wholesale customers that might want to purchase energy from someone else."(Oct., p.4).

Wisconsin Electric Power Company has had a general wheeling tariff on file at FERC for nine years. The company has been providing transmission service under this tariff to wholesale customers for six years. Since its inception, the amount of energy wheeled across the Wisconsin Electric system has increased dramatically. In 1990, the provision of transmission service will provide more than $1-million dollars to lower the company's costs to serve our retail and other wholesale customers. We've also signed up four investor-owned utilities for wheeling service under the general tariff. In fact, Wisconsin Electric has been wheeling power for WP&L for a year and a half.

In the future, I would hope *EL&P* would choose to recognize the many utilities around the country who have been quietly wheeling for wholesale customers for a long time. Far from being the first in the country, our fraternal neighbor to the west wasn't even the first on its block.

Patrick E. Woodke
Manager-Rates
Wisconsin Electric Power Co.
Milwaukee, WI

Editor's note: Apologies to Wisconsin Electric Power and other utilities that already may be providing open access to their transmission systems, even though we didn't give them credit for it. Like we said, we saluted WP&L for being the first utility we were aware of to announce that it was actively seeking wheeling customers.

In the future, we would hope that WEPCo and others would tell us what they are doing, so we can give credit where due, when it's due.

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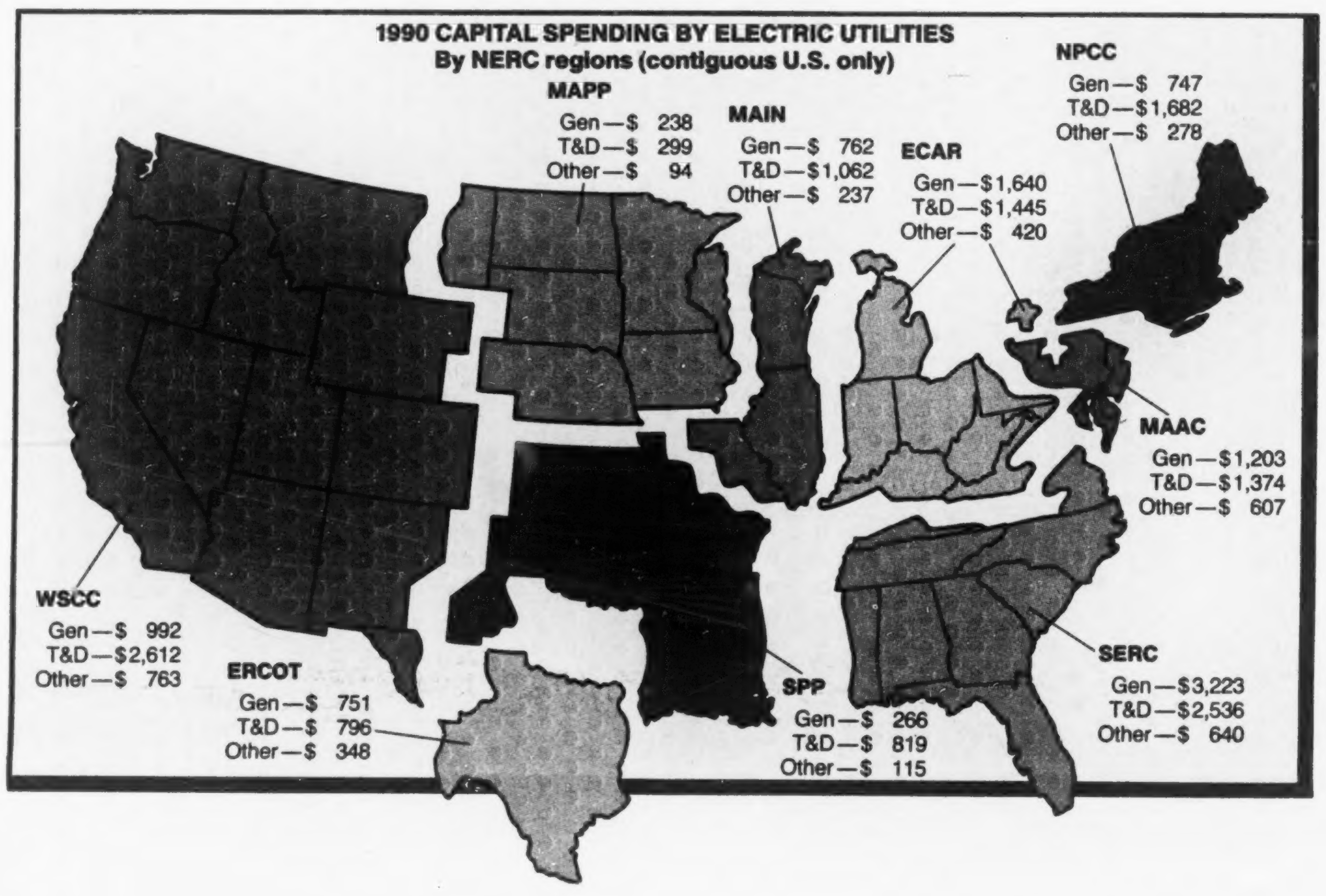
VOICE OF THE ELECTRIC UTILITY INDUSTRY

LATE NEWS

The Public Service Co. of New Hampshire board endorsed Northeast Utilities Co.'s $2.3 billion acquisition plan as part of a bankruptcy reorganization. Creditors' and stockholders' representatives previously agreed to NU's boosted bid. The move departs from PSNH's long-held hope to emerge as an independent company. Approvals are still needed from creditors, stockholders, state lawmakers and bankruptcy court. Seabrook full-power licensing is unlikely before Jan. 18.

Spending may hit $26B in '90



BARRINGTON, IL—U.S. electric utilities have planned construction investments totalling almost $26 billion for 1990, an increase of just over 3 percent from 1990 plans announced a year ago.

T&D spending will increase during 1990, but generation spending will fall below the $10-billion level for the first time in decades.

Longer term, *Electric Light & Power's* 1990 survey of capital spending plans of U.S. electric utility organizations—investor-owned, co-op, municipal, federal and other publicly owned utilities—showed a slight decrease in total capital spending for the five years 1990-1994 from five-year plans reported a year ago.

EL&P's Capital Spending Survey is part of a special report: Threshold to the 21st Century, beginning on page 17. The annual survey, which is based on the responses of cooperating utilities, is projected to represent the entire electric utility industry.

The five-year decrease is largely attributable to conservative projections for the fifth year of the period, plus continued low spending for generation. Total spending in that fifth year, $21 billion, is projected to be some $4 billion lower than in the fifth year of the projections made a year ago.

Although spending for generation facilities is slated to fall about $4 billion below 5-year projections made a year ago ($54 billion), T&D spending is estimated to increase almost that much through 1994. "Other" capital spending is projected to fall about 4 percent.

Thirty-four utilities reported that they will need additions to their power supplies before 1995, but only 14 reported plans to add their own capacity in that time period. Twenty-five utilities said they will need new capacity between 1995-2000 and 12 after 2000. But only seven utilities and two utilities, respectively, are planning to build their own generation additions.

Especially troublesome is the fact that of 80 units reportedly in the planning stages, 62 will burn either gas or oil. Only seven are slated to burn coal in baseload steam plants.

DOE delays N-waste repository to 2010

U.S. vs. NIMBYs

SAN FRANCISCO—The federal government will file suit against Nevada, if that state continues to refuse Department of Energy siting tests at Yucca Mountain for storing nuclear waste, the DOE said.

A realistic reassessment of the project's schedule requires extending the completion date until at least 2010, DOE officials added.

"Anyone who is even slightly knowledgeable about the challenges faced on the nuclear repository project must have expected a completion date later than was originally scheduled," explained Deputy Energy Secretary W. Henson Moore at a meeting of the American Nuclear Society and the U.S. Council for Energy Awareness in San Francisco.

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The DOE also proposed uncoupling the completion dates for the intermediate Monitored Retrievable Storage (MRS) facility and the permanent site. The date for the high-level nuclear waste respository previously had been extended from the congressionally mandated 1998 to 2003.

Moore stressed that early completion dates were based more on political expectations than on scientific data. "While no one can guarantee that there will not be any future delays in this project, the scheduled dates that we have now are fully supported by sound technical information."

Nevada conflict continues

The Nevada legislature had passed a resolution saying the Yucca Mountain site was unsuitable, prior to DOE geological tests. In addition, Gov. Bob Miller (D) opposes the Nevada site and blocking needed mits.

oore said surface ing at the Yucca ntain site will be rred until 1992 that the project would be abandoned if tests show the site is unsuitable.

The waste site news was part of a larger restructuring of management within DOE's Office of Civilian Radioactive Waste Management. OCRWM is responsible for selecting a site and building a permanent underground respository.

To help deal with the federal/state conflict, the administration planned to fill a position created in 1987 called civilian waste negotiator. Also in 1987, the Nuclear Waste Policy Act of 1982 was amended to suspend site characterization activities at all repository sites other than at Yucca Mountain.

The Nuclear Regulatory Commission mentioned that a delay past 2003 might be necessary in its September 1989 request for comments for the first five-year reevaluation of its 1984 Waste Confidence Decision.

Edison Electric Institute's David Swanson said he hopes the new schedule is realistic.

Swanson, EEI senior vice president, pointed out that "The full benefits of the MRS facility are only realized if it is constructed early. Therefore, we support DOE's decision to decouple the MRS construction schedule from that

Continued on page 3

PacifiCorp bids again, includes APS' parent, not MeraBank thrift

PORTLAND—PacifiCorp revised its offer to purchase Arizona Public Service Co. to include APS' parent, Pinnacle West Capital Corp., for $1.87 billion, minus the troubled MeraBank savings and loan subsidiary.

Because of debts amassed by PWCC subsidiaries, the revised offer is less than PacifiCorp's $2.08-billion offer for APS alone (*EL&P*, Dec.'89, p.1).

Although PWCC acknowledged both offers, no decision had been made as of mid-December. The company hired analysts to study the offers.

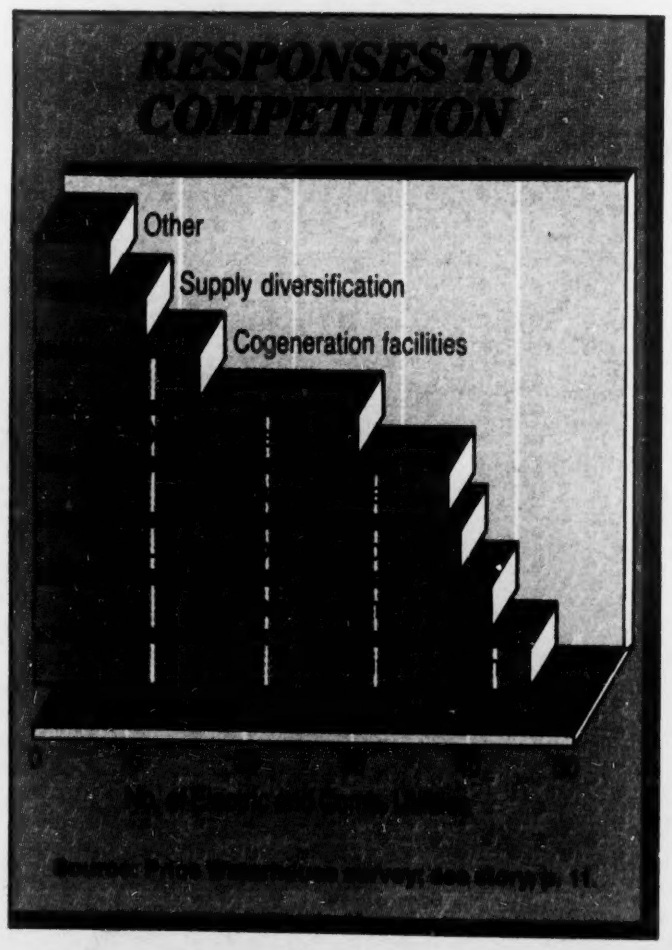
Under the revised offer PacifiCorp would:

- Swap PWCC stock valued at $8 per share for 0.18 share of PacifiCorp share, for a total of about $694 million.
- Assume $800 million in PWCC debt.
- Either pay cash or swap stock for APS preferred stock.
- Require a MeraBank capital infusion and spinoff. PWCC may have satisfied the first part of this requirement Dec. 6 by meeting financial regulators' demands by agreeing to a $450-million transfer of cash and securities to the troubled savings and loan.
- Hinge the offer on PWCC assets being worth at least $300 million without MeraBank, not counting APS. (PWCC also owns financially hurting real estate interests and a uranium mine.)

While PacifiCorp was unable to project merger savings, unlike the recent merger with Utah Power & Light Co. in which the two companies collaborated prior to the announcement.

Chris Hunter, PacifiCorp spokesperson, said the merger would create 600 MW of peak capacity savings by merging seasonal peaks of the utilities.

PacifiCorp set no deadline for response. PWCC had a Dec. 20 board meeting scheduled.



NEWS BRIEFS

JILL MINNER, Special Projects Editor

PUC requires electric utilities in Ohio to look into least-cost options

The Public Utilities Commission of Ohio has adopted new rules on integrated resource planning which require electric utility companies in Ohio to prove that they have explored least-cost options when making their future load growth plans. According to the NARUC Bulletin, the utilities must provide the commission with new plans that will be subject to hearings and review at least every five years. Under the statute, the PUC must determine whether forecasts of loads and resources are reasonable in relation to population growth estimates and economic development forecasts.

PG&E, environmental groups join to conduct energy efficiency study

Pacific Gas & Electric Co. announced that it will participate in a three-year, $10-million study to improve efficiency in the use of electricity. Also participating in the project are the Natural Resources Defense Council, Lawrence Berkeley Laboratory, and Rocky Mountain Institute (RMI). "We are enthusiastic about this program because it will benefit both our customers and the environment," said Virgil Rose, senior vice president and general manager of PG&E's Distribution Business Unit. According to PG&E, residential, commercial, industrial and agricultural applications of new lighting, building-design and electric-motor technologies will be studied. "This joint project will, for the first time, field test comprehensive packages of the best technologies and measure what they cost and what they save," explained RMI Research Director Amory Lovins.

Iowa-Ill. Investment buys part of Synergics

Iowa-Illinois Investment Co., a wholly owned subsidiary of Iowa-Illinois Gas and Electric Co., has acquired a 44-percent ownership interest in Synergics, Inc. According to Iowa-Illinois Investment, Synergics is an independent power and engineering services company that develops, owns and operates hydroelectric plants and cogeneration projects providing electricity and steam service. "This investment fits with our strategic goal to increase the emphasis in our non-utility investment program on energy businesses," explained Stanley Bright, president of Iowa-Illinois Investment Co.

Consumers Power to sell Bay City operations

Consumers Power said it has agreed to sell its Bay City, MI, residential and commercial electric operations to Bay City Electric Light and Power Co. for $2.4 million. The utilities have duplicative retail electric facilities in Bay City. The transfer of about 4100 customers will take place in stages, according to Consumers Power.

Finnish firm acquires boiler manufacturer

The Keeler Division of Dorr-Oliver has been acquired by Tampella Ltd, a $1.5-billion industrial company headquartered in Tampere, Finland. Keeler has facilities in Williamsport, PA, and Milford, CT, and is a major participant in circulating-fluidized-bed, municipal-waste, and mid-sized industrial boilers. "This acquisition will be a major milestone in Tampella's growth," stated Jorma Alajarvi, president of Tampella's Power Industry Division. "It not only provides us with a U.S. manufacturing and power boiler marketing capability but it provides a base for enhancing retrofit and after sales service for recovery boilers," he added. The new company, Tampella Keeler, will be operationally integrated with Tampella Power Industry Division activities in Atlanta, GA. Regarding the acquisition, Keeler President Albert Leon said that, "...we will now be in a position to exploit our leading-edge circulating-fluidized-bed and municipal solid waste technologies in the European markets where Tampella has a strong presence."

Approval recommended for Virginia Power, ODEC generating plant

The State Corporation Commission (SCC) Public Utilities Staff recommended approval of a coal-fired generating facility to be developed jointly by Virginia Power and Old Dominion Electric Cooperative. The proposed facility is a two-unit, 786-MW plant to be built near Clover, VA. According to the commission, one of the units would be operational by December 1993, and the second by December 1994. The SCC said the project cost is estimated at $805 million.

New chairman takes over at Atlantic Energy

E. Douglas Huggard has been appointed chairman and chief executive officer of Atlantic Energy and Atlantic City Electric Co. He succeeds John D. Feehan who retired as chairman on Dec. 31, 1989. Huggard has served as president and CEO of Atlantic Electric since 1984, and as president and CEO of Atlantic Energy since its formation in 1987. Jerrold L. Jacobs was named president and director of Atlantic Energy and president and chief operating officer of Atlantic Electric.

Central and South West appoints new president

Central and South West Corp. has chosen E.R. Brooks as president and chief operating officer. Brooks, previously executive vice president of Central and South West and president and chief executive officer of Central and South West Services Inc., replaces Merle L. Borchelt as president. Central and South West Corp. is a Dallas-based public utility holding company.

Commonwealth Edison names Zech to board

Retired Vice Admiral Lando W. Zech Jr. has been named to Commonwealth Edison's Board of Directors. "The wealth of experience that Admiral Zech brings with him from the Nuclear Regulatory Commission and the Navy will be especially helpful to Commonwealth Edison in maintaining and enhancing the high levels of performance it has achieved in its nuclear operations," stated ComEd Chairman James J. O'Connor. Zech served as NRC Chairman from July 1986 to June 1989.

CMP chairman chosen

Central Maine Power Co. has selected John J. Russell as chairman of the board. Russell, who will take over his new position on Jan. 25, succeeds the retiring George H. Ellis. A member of the CMP Board since 1977, Russell has also served as CMP vice chairman since 1988.

Gulf States River Bend achieves safety record

Gulf States Utilities Co. announced that employees at its River Bend power plant now hold the best safety record posted by an operating unit of the company. River Bend employees logged in over 8,991,205 safe work hours in early November, according to Gulf States. "I'm proud of the employees for their continuing commitment to quality through safe and reliable operation of the plant," said Gulf States Chairman and President Linn Draper.

Dow coal gasification process wins award

The fourth International Conference on Technologies for Producing Electricity in the 21st Century presented its 1989 Innovative Technology Award to Dow Chemical Co. for its coal gasification process. "The Dow coal gasification plant in Plaquemine, LA, the world's largest single train coal gasification plant, has been successfully operating for two and a half years," stated conference cochairman Seymour Alpert. "This commercial plant has achieved 103 percent of capacity and for 90 consecutive days attained 69 percent of capacity," he added. The conference is cosponsored by the Electric Power Research Institute, the New Energy and Industrial Technology Development Organization of Japan, and Kernforschungsanlage Julich of West Germany.

CEA awards HBM&S for energy efficiency

The Canadian Electrical Association has presented its Energy Efficiency Award for Industry to the Hudson Bay Mining & Smelting Co. Ltd. Flin Flon Division, located in Manitoba. According to Manitoba Hydro, the award is given to the industry which has distinguished itself by achieving exceptional efficiencies in the management of energy through innovative and practical applications. Entries for the award were also judged on cost effectiveness, environmental benefits, impact on quality control and reduced material waste. The award program is intended to encourage industries to review their operations and make changes which will result in more efficient energy use, according to Manitoba Hydro Eastern Region Division Manager Al Macatavish.

Utilities fined by NRC

The U.S. Nuclear Regulatory Commission recently proposed the following fines:

Carolina Power & Light Co.
A $75,000 civil penalty for alleged violation of NRC requirements at the H.B. Robinson nuclear power plant.

Omaha Public Power District
A $25,000 fine for alleged violations of NRC regulations which require the safeguarding of physical security information at the Fort Calhoun Station.

Portland General Electric
A $280,000 fine for alleged violations of NRC requirements involving the operability of a safety system at the Trojan nuclear plant.

Public Service Company of New Hampshire
A $50,000 fine for procedural errors committed during a test at its Seabrook Station nuclear power plant.

Sacramento Municipal Utility District
A $50,000 fine for alleged violations of NRC requirements involving the emergency preparedness program for the Rancho Seco Nuclear Generating Station.

Tennessee Valley Authority
A $87,500 fine for violations of NRC requirements governing the operation of the Sequoyah nuclear power plant.

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COMMENTARY

2000—Closer than you think

It's begun. The decade of the '90s. The last 10 years before the new century dawns. So it's a good time to pause, to look ahead, and back...to see where we've come from and where the industry is going. It's a time to measure successes and failures and assess the industry's future, and the obstacles that may impede progress toward meeting future challenges.

The electric utility industry today is at a crossroad. It has survived two decades of war with new and potent opponents. These forces, charging ahead under the banners of consumerism, environmentalism, anti-growth, anti-establishment, anti-nuclear technology and other well-intentioned causes, caught the industry as it was beginning to recover from its own Pearl Harbor...the Arab Oil Embargo and subsequent run-ups of fuel costs. The industry's been battered by inflation, unfavorable financial conditions, declining load and demand growth, ambitious planning and construction programs, over-zealous and short-sighted regulation and adverse publicity. But despite all these, and more, the industry and most of its parts have met every challenge, providing electric service to customers with the highest reliability of any electric system in the world and with costs that, although not the lowest, are certainly far from the most expensive among nations of the world. The question now is how well electric utilities will perform for the balance of '90s.

The industry's past success would suggest that it can and will meet its challenges, and 10 years from now it will be as ready for 2000 as it's ready for 1990 today. But complacency—status quo thinking—is an opiate. Realistically, developing conditions suggest *status quo* management won't succeed any longer.

The electric utility industry is far different today from what it was less than just five years ago. Reregulation has taken its toll. New holding companies, conceived to facilitate diversification and reap the harvests of non-regulated incomes, have become more the rule than the exception among investor-owned utilities. But many have found diversification to be less of a gravy-train, and more a crap-shoot, with more losers than winners. A number of once-strong industry giants are financially weak. Aggressive state commissions have taught utility managements bitter lessons about risk...called "You bet your company...and you lost."

In response, and with support of federal agencies, managements of many larger utilities no longer plan to build facilities to ensure power supply sufficiency to meet customer demand. Thus, many utilities are depending increasingly on non-utility sources, and Canadian power surpluses.

Our 1990 Capital Spending Survey, page 21, says little baseload capacity will be built before 2000. Morover, despite widespread brownouts and blackouts incurred in the relatively mild summer of 1989, respondents' reported capacity addition plans fall far short of what the Department of Energy, Edison Electric Institute and many other highly qualified observers say is needed for 2000. The survey reveals only about 50,000 MW of new capacity will be built by utilities by the early years of the next century...far short of the 100,000 to 200,000 MW estimated to be needed. Can non-utility sources be counted on to make up the difference? And what can be done to account for the potential reduced output of ever-aging power plants?

The upside of the survey is increased investment in T&D facilities, which may allow utilities to better share the excess capacity in some areas with less fortunate utilities in capacity-deficient areas.

The upshot of all this is that the industry is entering the new decade treading precariously on a tightrope. Declining financial strengths, reduced generation margins, increasing dependence on non-utility sources for energy and greater customer susceptibility to anti-utility movements will make management of electric utility organizations substantially more complex, and probably a lot more uncomfortable for those involved.

Far from being a prophet of doom, I firmly believe electric utility managements can rise to the challenges of the '90s and beyond. But it's going to take a different breed of manager, with strong entrepreneurial courage and the willingness to attack each new problem in light of its own individual characteristics...and a lot more intestinal fortitude *Status quo* management may have worked through the 70s and much of the 80s. But it certainly won't work during the next 10 years.

Robert A. Lincicome, Editor-in-Chief

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PG&E tallies more numbers from earthquake recovery

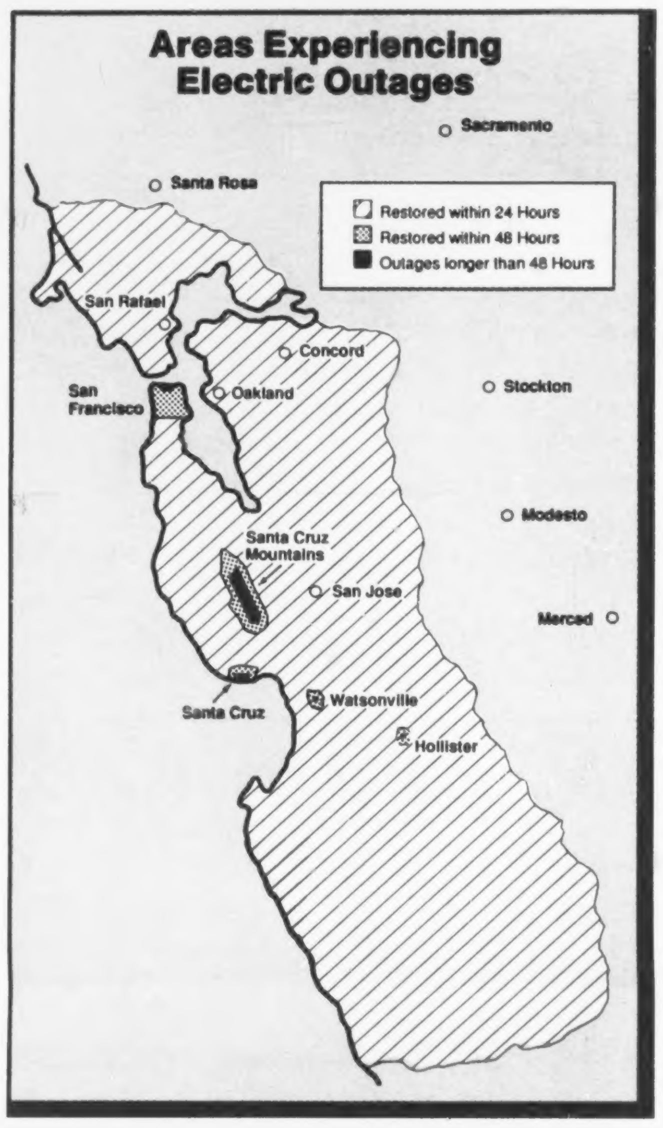
SAN FRANCISCO—Disaster control comes first; numbers are handled later.

After reconnecting electric and gas customers, repairing facilities and cleaning up the mess after the Oct. 17, 1989, 7.1-magnitude earthquake, Pacific Gas and Electric Co. officials have some more details.

- More than 150,000 out of 3.2-million gas customers required company assistance for checking connections and relighting pilot lights. Cautious customers shut off the majority of those gas connections, although the city fire department asked PG&E to shut off about 7350 for safety reasons.
- About 13 miles of gas line was replaced. More than 10 miles of cast iron and steel pipeline were replaced with plastic pipe. About 1500 services connecting 5400 individual gas meters were replaced, in some areas at a rate of more than 3000 feet per day.
- As much as 70 percent of the required gas-line trench fill, about 1200 tons of sand a day, was screened, sifted and refilled. Without the emergency central recycling plant, debris would have had to be hauled through traffic-congested San Francisco to a landfill site—1.5 hours per round trip, 60 truckloads daily.
- Three 242-kV dead-tank high-voltage circuit breakers were airlifted to PG&E's San Mateo, CA, substation Oct. 21 via a U.S. Air Force C5A transport plane with the help of The Federal Emergency Management Administration and the Department of Defense.

Three additional ones were trucked from the Greensburg, PA, plant Oct. 24 and installed at PG&E's Sobrante substation in Orinda, CA. Westinghouse ABB Power T&D Co. (ABB Power Systems Inc., as of Jan. 1) manufactured the breakers.

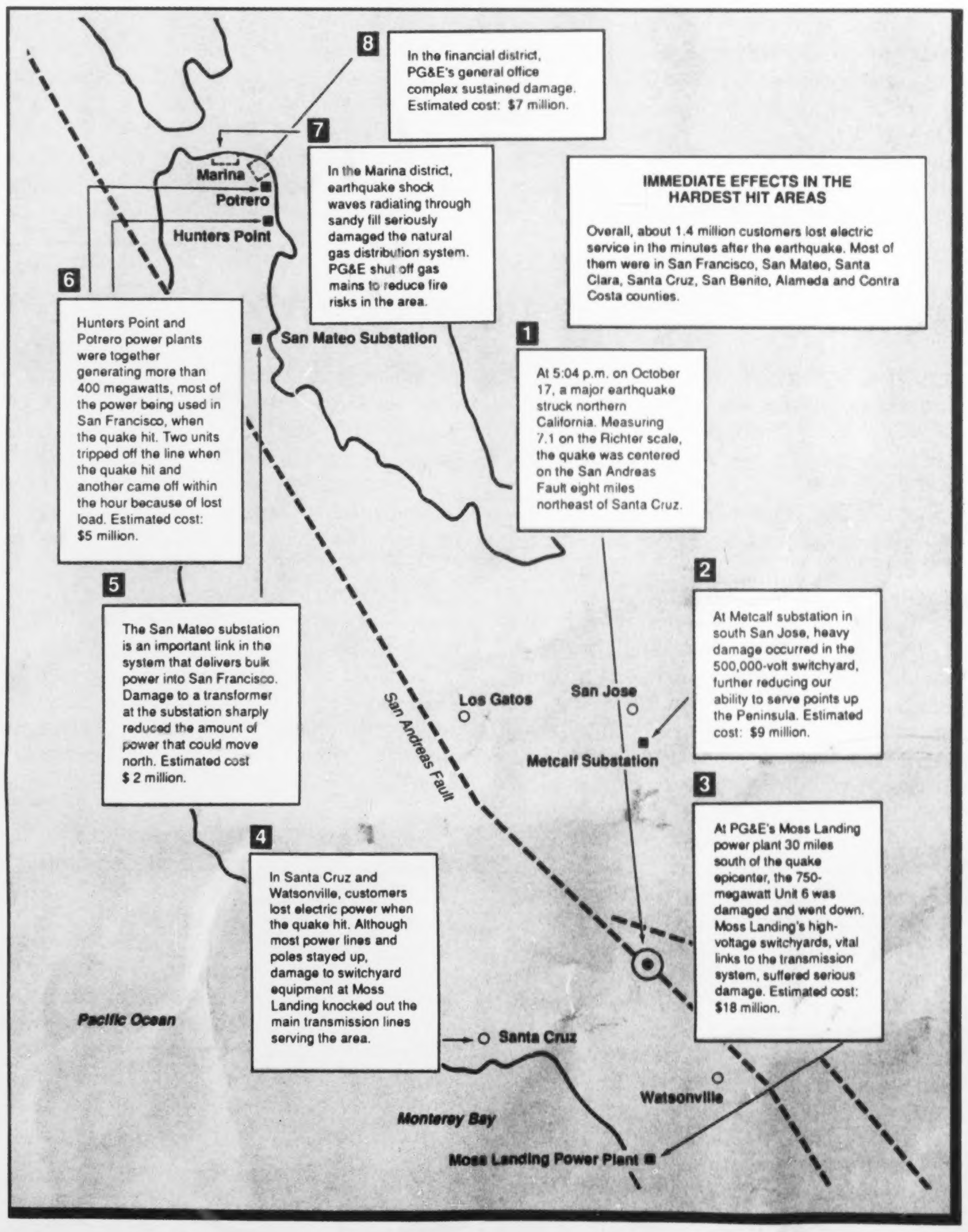
- See maps for additional information on electrical outages. (See also *EL&P* '89 Dec. p.1, Nov. p.18.)



Southwire buys Hi-Tech

CARROLLTON, GA—After three months of negotiation, Southwire Co. bought Hi-Tech Cable Corp., whose plant in Starkville, MS, is among the largest copper wire-and-cable production facilities in the United States.

Jim Richards, Southwire's president, said, "This purchase will expand our product line to include industrial power cable and give us a substantial addition to our building wire capacity."



IMMEDIATE EFFECTS IN THE HARDEST HIT AREAS

Overall, about 1.4 million customers lost electric service in the minutes after the earthquake. Most of them were in San Francisco, San Mateo, Santa Clara, Santa Cruz, San Benito, Alameda and Contra Costa counties.

1 At 5:04 p.m. on October 17, a major earthquake struck northern California. Measuring 7.1 on the Richter scale, the quake was centered on the San Andreas Fault eight miles northeast of Santa Cruz.

2 At Metcalf substation in south San Jose, heavy damage occurred in the 500,000-volt switchyard, further reducing our ability to serve points up the Peninsula. Estimated cost: $9 million.

3 At PG&E's Moss Landing power plant 30 miles south of the quake epicenter, the 750-megawatt Unit 6 was damaged and went down. Moss Landing's high-voltage switchyards, vital links to the transmission system, suffered serious damage. Estimated cost: $18 million.

4 In Santa Cruz and Watsonville, customers lost electric power when the quake hit. Although most power lines and poles stayed up, damage to switchyard equipment at Moss Landing knocked out the main transmission lines serving the area.

5 The San Mateo substation is an important link in the system that delivers bulk power into San Francisco. Damage to a transformer at the substation sharply reduced the amount of power that could move north. Estimated cost $ 2 million.

6 Hunters Point and Potrero power plants were together generating more than 400 megawatts, most of the power being used in San Francisco, when the quake hit. Two units tripped off the line when the quake hit and another came off within the hour because of lost load. Estimated cost: $5 million.

7 In the Marina district, earthquake shock waves radiating through sandy fill seriously damaged the natural gas distribution system. PG&E shut off gas mains to reduce fire risks in the area.

8 In the financial district, PG&E's general office complex sustained damage. Estimated cost: $7 million.

T&D spending leads construction plans; generation expansion lags through 1994

Gas and oil favored for new generating units, but utilities still are reluctant to commit to building new capacity

Robert A. Lincicome
Editor-in-Chief

The nation's electric utility organizations will continue to accelerate their construction activities through the five-year period ending in 1994. Construction of transmission and distribution facilities will lead the expansion. These are the primary conclusions to be derived from *Electric Light & Power*'s 1990 Capital Spending Survey, which was completed in November.

The survey indicated that spending in 1990 should increase by more than three percent from projections of 1990 spending made a year ago. Total 1990 spending should reach $25.9 billion, and might edge over $26 billion before the year is out. Results from the study, which includes survey data from all types of electric utilities in the nine North American Electric Reliability Council areas, are projected to be representative of the entire industry.

1990 spending plans

Capital spending in 1990 is projected to total $25.9 billion. Although this reflects a drop from projected 1989 spending, it will be $799 million, or 3.2 percent, above 1990 projections made last year. As shown in the table at right, generation spending should be better than $9.8 billion, but this would be down some $200 million from projections made a year ago and would make 1990 the first year in more than two decades that generation spending did not exceed $10 billion.

Transmission and distribution spending, which combines substation, transmission line and distribution service projects, should total $12.6 billion, up almost $1 billion, or 8.3 percent, from the earlier 1990 projections.

Spending in 1990 for other projects should be about $3.5 billion, roughly the same as projected for 1990 in last year's survey.

Spending in 1989 was projected to be $27.5 billion, so the 1990 outlook reflects a decline of more than $1.6 billion. The major difference, as might be expected, is in generation construction, which was projected to total $12.4 billion in 1989 versus $9.8 billion for 1990. Utilities simply have finished the majority of their major generation projects and are moving slowly in terms of beginning new capacity additions. Moreover, as is pointed out below, efforts to modify, upgrade and extend the lives of generating stations still appear to be in low gear.

Five-year outlook good, not great

Longer term construction spending, for the period 1990-1994, should remain at a somewhat higher level than estimated a year ago. However, much depends on spending in the fifth year of the period, 1994. It is normal for estimates of spending in the last year of a five-year period to be lower than in the first four, but this year's survey reflected unusual conservatism.

For the first four years, 1990-1993, spending plans are projected at $106.6 billion. For those same years, the projections made a year ago showed a total of $101.3 billion. Thus this year's survey reflects a healthy, but unspectacular, 5.2-percent increase in capital spending.

But this year's survey projection for the fifth year in the period, $21.1 billion, is $4 billion below the fifth year's projections in last year's study. Both generation and distribution projections for the fifth year are about $2 billion below fifth-year projections made a year ago.

Generation spending demonstrates no definite trend. Instead, generation capital expenditures bounce up and down through the period, but will average $9.99 billion for each of the five years. This represents an $809-million, 7.5-percent decline from projections made a year ago.

Transmission and distribution spending, which includes amounts specified for substations, will total $61.9 billion, $4.4 billion or 7.7 percent more than projected a year ago. Average annual T&D spending over the period will be $12.4 billion.

Readers are cautioned that all three sets of figures making up T&D expenditures are subject to error since some companies isolate substation spending, others combine substation expenditures into their spending plans for transmission and distribution expansion, and still others give only a single expenditure figure for all T&D expansion.

Spending in the "other" category is scheduled to decline throughout the five-year period.

Readers also are cautioned that totals shown in the accompanying tables reflect rounding and slight variations may appear between them and added categorized capital expenditures.

Funds for generation will remain at below 40 percent of total capital expenditures through 1993, then will surge to 45 percent in 1994.

NORTH AMERICAN ELECTRIC RELIABILITY COUNCILS

ECAR	East Central Area Reliability Coordination Area
ERCOT	Electric Reliability Council of Texas
MAAC	Mid-Atlantic Area Council
MAIN	Mid-America Interpool Network
MAPP	Mid-Continent Area Power Pool
NPCC	Northeast Power Coordinating Council
SERC	Southeastern Electric Reliability Council
SPP	Southwest Power Pool
WSCC	Western Systems Coordinating Council

1990 CAPITAL SPENDING BY NERC REGION
(Contiguous U.S. only—in millions of $)

Region	Generation	Substations	Transmission	Distribution	Other	Total
ECAR	$ 1,640	$ 211	$ 272	$ 962	$ 420	$ 3,505
ERCOT	751	32	235	529	348	1,895
MAAC	1,204	150	214	1,011	607	3,186
MAIN	762	64	320	678	237	2,061
MAPP	238	54	98	147	94	631
NPCC	747	377	315	990	278	2,707
SERC	3,223	164	574	1,798	640	6,399
SPP	266	70	221	528	115	1,200
WSCC	992	281	726	1,605	763	4,366
Total	**$9,822**	**$1,403**	**$2,976**	**$8,246**	**$3,502**	**$25,950**

CHANGING PATTERNS OF INVESTMENT
1990-1994

Function	1990	1991	1992	1993	1994
Generation	37.85%	38.06%	35.75%	39.94%	45.18%
T&D	48.65%	49.57%	51.41%	48.36%	43.61%
Other	13.50%	12.36%	12.84%	11.71%	11.21%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Transmission and distribition expenditures will increase from more than 48 percent in 1990 to almost 51.5 percent in 1992, then their share will decline through 1994. Total 1994 expenditures appear to be exceptionally conservative and unrealistically low, as mentioned above. Generation expenditures in that year are envisioned to be more than a half-a-billion dollars below the average for the previous four years. Also, fifth-year T&D estimates reflect the usually shorter lead times for T&D programs and are probably artificially low. The combination of these two facts also is a large factor in the relative shift in the percentages for generation and T&D in that year.

Seventy-one utilities reported their capacity needs until after 2000. Of these, more than half (34 utilities) indicated need for new capacity before the end of 1994. About 35 percent said they will need new capacity between 1995 and 2000 and 12 reported that they will need new capacity after 2000.

But only about 20 percent currently have plans to add their own capacity through 1994, 10 percent between 1995 and 2000, and just 7 percent after 2000.

Clearly, developing programs to utilize the capacity of cogenerators, independent power producers and demand-side alternatives loom large in utility plans to meet increasing load.

Respondents reporting plans for new capacity favor small units of less than 200 MW. Almost half the 72 units specified will be under 100 MW and 28 percent will be between 100 and 200 MW. Only 10 percent will be sized above 500 MW.

Utilities reported that almost 70 percent of the units planned will either be combustion turbines or combined cycle units. Less than 10 percent will be base-load steam units.

As to fuel, natural gas is the choice for 60 percent of the units. Oil was picked for 18 percent of the units planned. Coal is the specified fuel for seven units, the same number of baseload

Continued on page 22

PROJECTED 5-YEAR CAPITAL EXPENDITURES
(By NERC Region — in millions of $)

Region	1990	1991	1992	1993	1994	5-Year total
ECAR	$ 3,505	$ 3,972	$ 3,575	$ 3,586	$ 3,223	$ 17,860
ERCOT	1,895	1,933	751	1,024	1,553	7,155
MAAC	3,186	3,207	3,308	3,443	3,872	17,016
MAIN	2,061	2,042	1,973	1,763	931	8,770
MAPP	631	574	519	447	460	2,630
NPCC	2,707	3,030	3,027	3,021	1,304	13,089
SERC	6,399	7,183	6,176	7,635	5,877	33,270
SPP	1,200	1,464	1,406	1,460	1,224	6,755
WSCC	4,366	4,480	4,863	4,778	2,607	21,094
Total	**$25,950**	**$27,883**	**$25,597**	**$27,159**	**$21,050**	**$127,639**

PROJECTED 5-YEAR CAPITAL EXPENDITURES
(By Function — in millions of $)

Function	1990	1991	1992	1993	1994	5-Year total
Generation	$ 9,822	$ 10,614	$ 9,150	$ 10,846	$ 9,512	$ 49,944
Substations	1,403	1,512	1,458	1,501	1,165	7,038
Transmission	2,976	3,472	3,559	3,135	2,286	15,429
Distribution	8,246	8,838	8,143	8,497	5,728	39,452
Other	3,502	3,447	3,287	3,180	2,360	15,776
Total	**$25,950**	**$27,883**	**$25,597**	**$27,159**	**$21,050**	**$127,639**

steam units planned.

It should be a source of some concern that natural gas has become the fuel of choice, following the failure of gas backout regulations in the 70s and early 80s, calling for elimination of gas as a powerplant fuel. But reporting utilities evidenced no reservations, except to suggest that units would have oil-burning capacity as well. Since most utility fuel oil will come from offshore, and since oil is the second choice among planners of new units, current utility plans raise questions of energy security, as well as balance-of-trade issues.

NEXT CAPACITY NEEDED	
1990	11
1991	5
1992	3
1993	9
1994	6
1995-97	12
1998-2000	13
2000+	12

NEXT CAPACITY TO BE ADDED	
1990	4 utilities
1991	2 utilities
1992	1 utilities
1993	4 utilities
1994	3 utilities
1995-97	4 utilities
1998-2000	3 utilities
2000+	2 utilities
Total	23 utilities

TYPE CAPACITY TO BE ADDED	
Baseload Steam	7 units
Combustion Turbine	38 units
Hydro	5 units
Combined Cycle	15 units
Other	14 units
Total	79 units

Brownouts reported

Respondents reported broad experiences with brownouts last summer. Seventy-five utilities encountered the problem at least once during the sunmer, but only eight said they encountered full-scale blackouts.

Plant modifications reported

While powerplant modifications of one sort or another were shown to be common among all types of utilities with generation facilities, there still is considerably more study than actual programs. Only 30 utilities reported formal life extension programs, per se. Another 17 said they were involved in plant modifications and 16 reported uprating programs. Twenty-two utilities reported "other" programs. A number also reported they had intensified their plant maintenance programs.

FUEL FOR NEXT UNIT	
Gas	48 units
Oil	14 units
Coal	7 units
Other	10 units
Total	79 units

IMPROVING PRESENT UNITS	
Life Extension	30 utilities
Uprating	16 utilities
Modernization	17 utilities
Other	22 utilities
Total	85 utilities

ECAR

	Gen	T&D	Other
1990	$ 1,640	$ 1,445	$ 420
1991	1,930	1,613	428
1992	1,530	1,595	449
1993	1,556	1,585	446
1994	1,450	1,456	317
Total	8,106	7,694	2,060

Utilities that make up the **East Central Area Reliability Council** plan capital investments totalling $17.9 billion over the five years 1990-1994. This represents an increase of $4.1 billion, or almost 24 percent, as compared with their five-year plans reported last year.

While generation projects reflect an increase of more than $1 billion, T&D expansion represents the major increase. T&D spending will total $7.7 billion, $2.4 billion or more than in last year's survey. Other, non-categorized project spending will total $2 billion, up 39 percent.

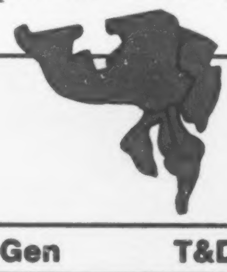
ERCOT

	Gen	T&D	Other
1990	$ 751	$ 796	$ 348
1991	896	805	232
1992	189	438	124
1993	426	491	108
1994	825	602	126
Total	3,086	3,132	937

Utilities in the **Electric Reliability Council of Texas** will invest substantially greater capital for generation in the 1990-1994 period than earmarked for the 1989-1993 period. Generation investment will total $3.1 billion, $1.3 billion over last year's five-year projection. T&D spending will decline about $800 million from last year's projections, but total capital spending, at $7.2 billion, will be up about 6 percent.

This year's projections should be considered to be a return to normal after poor ERCOT participation raised projectability questions last year.

MAAC



	Gen	T&D	Other
1990	$ 1,204	$ 1,374	$ 607
1991	1,153	1,480	573
1992	1,163	1,571	574
1993	1,324	1,663	455
1994	1,601	1,753	518
Total	6,445	7,842	2,728

Mid-Atlantic Area Council utilities will invest $17 billion for new facilities in the 1990-1994 period, up about $3 billion from last year's projections. Both generation and "Other" capital spending will grow slightly, but the major increase will be in T&D activities, a category which is projected to climb $2.5 billion, to more than $7.8 billion.

MAAC utilities are planning some new capacity additions, largely in under-100-MW sizes, although some baseload capacity is slated for the mid-90s and beyond.

Most MAAC utilities report some ongoing life extension or power plant modification programs.

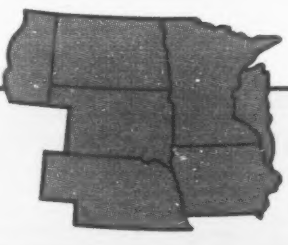
Utilities in the **Mid-America Interpool Network,** comprising utilities in Illinois, Eastern Wisconsin and Northeastern Missouri, will concentrate their capital construction programs in T&D projects, $4.8 billion in the 1990-1994 period. Projected T&D investment will be about 13 percent greater than in last year's forecast. Generation spending, while still lagging T&D spending substantially, will be up about 8 percent, to $2.8 billion. With a relatively comfortable reserve, MAIN utilities will concentrate their capacity additions on peaking units of less than 100 MW.

MAIN

	Gen	T&D	Other
1990	$ 762	$ 1,063	$ 237
1991	635	1,182	225
1992	576	1,161	235
1993	481	1,072	210
1994	386	396	149
Total	2,840	4,874	1,056

Mid-Continent Area Power Pool utilities, with the lowest demand and capacity of the nine NERC regions, will spend some $2.6 billion through 1994. But spending will decrease annually through the five years. Major thrust for system expansion will be in the area of transmission and distribution, where annual expenditures will remain fairly consistent in the $270-$300 million range. Generation expenditures will peak this year and fall off for the remaining four years of the period. Other spending will taper off throughout the five-year period.

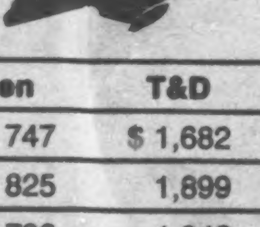
MAPP



	Gen	T&D	Other
1990	$ 238	$ 299	$ 94
1991	221	279	73
1992	190	276	53
1993	132	270	44
1994	143	280	36
Total	925	1,404	300

U.S utilities in the **Northeast Power Coordinating Council**, although having suffered brownouts last summer and facing increasingly tightened capacity margins over the next five years, will devote the majority of their capital investment to transmission and distribution, peaking in 1992 at $1.94 billion. Increasing dependence on power from the pool's Canadian utilities will call for additional international transmission capacity. Generation spending will be devoted largely to combustion turbines and combined-cycle units.

NPCC



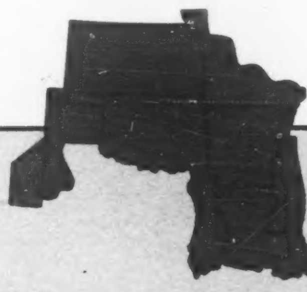
	Gen	T&D	Other
1990	$ 747	$ 1,682	$ 278
1991	825	1,899	306
1992	792	1,943	292
1993	803	1,914	304
1994	276	942	86
Total	3,443	8,380	1,266

SERC

	Gen	T&D	Other
1990	$ 3,223	$ 2,536	$ 640
1991	3,661	2,850	672
1992	3,431	2,318	427
1993	4,821	2,310	505
1994	3,966	1,626	285
Total	19,101	11,640	2,529

Utilities making up the **Southeastern Electric Reliability Council** will spend more for system expansion in the next five years than utilities in any other NERC region. In fact, SERC utilities will spend more than one in every four dollars of capital spent for new and improved facilities in the U.S. SERC utilities will spend $19.1 billion for generation, almost 40 percent of all generation spending in the country. Generation spending will peak in 1993. NERC utilities also will spend $11.6 billion for T&D, peaking in 1991. Total spending by SERC utilities will peak in 1993.

SPP



	Gen	T&D	Other
1990	$ 266	$ 819	$ 115
1991	386	952	126
1992	390	905	111
1993	332	1,032	96
1994	368	769	88
Total	1,742	4,477	536

Southwest Power Pool utilities also are committed to increasing transmission and distribution systems while curtailing generation system additions. Overall, SPP utilities will invest $1.7 billion for generation facilities, both new and upgraded, while spending almost $4.5 billion for T&D system expansion. The years 1991 and 1993 will be the biggest years for construction spending at about $1.6 billion each, with 1993 being the biggest year for T&D system expansion. "Other" capital expenditures will decline from 1991.

WSCC

	Gen	T&D	Other
1990	$ 992	$ 2,611	$ 763
1991	906	2,762	812
1992	889	2,952	1,022
1993	971	2,795	1,012
1994	497	1,355	755
Total	4,255	12,476	4,363

Utilities making up the **Western States Coordinating Council** constitute the nation's second largest market for electrical system expansion. WSCC utilities will invest almost $21.1 billion for new system in the five-year period. Three of every four dollars spent for system improvements will be spent for T&D expansion. The biggest capital spending year for T&D will be 1992, while 1990 will be the big year for generation expansion. WSCC utilities will spend more for "Other" capital investment than for generation projects.

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Record cold wave brings blackouts

Demand highs compound TX, FL generating problems; DSM helped

Mark T. Hoske
News Editor

How cold was it? That may sound like a comedy routine, but few people were laughing.

It was so cold that...

- Record peak demands resulted in rolling blackouts at Florida Power Corp. (FPC) and Florida Power & Light Co. on Dec. 24 and 25. Some areas were below freezing for three days, with several reaching zero.
- Tampa Electric Co., Jacksonville Electric Authority, Houston Lighting & Power Co., Lower Colorado River Authority, and San Antonio City Public Service were among other utilities that also had to institute blackouts during the cold snap.
- Utilities in regions able to meet demand also set winter and all-time electricity records, hitting demand peaks not expected until the mid- and late '90s.
- Warm-weather-minded engineers are rethinking some power plant designs that caused tripping during the record freeze, which was coupled with high winds. In some cases, changes were as easy as adding insulation to outdoor pipes.
- A number of utilities' natural gas customers experienced reduced flow for several hours because of high demand and resulting low pressure in gas lines. Some gas-fired generation without firm contracts was idled or capacity was cut by switching to fuel oil.
- Florida Gov. Bob Martinez declared the state a disaster area because of the loss of an estimated 30 percent of the citrus crop and severe damage to other crops, nursuries and tropical fish.
- Edison Electric Institute's tally of electrical output listed a total U.S. increase of 20 percent for the week ending Dec. 23, with the highest increase in the Southeast region, up 33.1 percent. For the week ending Dec. 30, total U.S. electrical output increased 12.8 percent, with the highest increase again in the Southeast, up 25.5 percent (see p. 3).

Electric space heaters

"Florida had extremely cold weather, the kind they don't normally plan for," explained Eugene F. Gorzelnik of the North American Electric Reliability Council (NERC).

"Because of the severity of the cold weather, everyone tried putting on electric heaters," he said. And that led to demand beyond available capacity.

The 1989 Reliability Assessment listed the winter peak for the Southeastern Electric Reliability Council region at 108,649 MW for winter '88/'89 and 114,642 MW for this winter. Gorzelnik said "a whole series of new peaks were set," although figures were not yet available.

NERC said in its '89/'90 assessment that "generation capacity in SERC over the next 10 years will be adequate to serve the projected peak demands and annual energy requirements" from 1988 to '98.

What happened? "It lasted longer and the temperature went lower than anyone could [economically] plan for," Gorzelnik pointed out.

All in all, power supply problems could have been more widespread if the cold had not come over holidays, suggested Charles Wynn, administrative manager of Southeastern Electric Reliability Council (SERC).

Except for the Florida utilities, others in the region had peaks just a few percentage points over forecasts and were able to meet loads using demand management, he pointed out.

Wynn said that preliminary estimates show a peak for the Florida utilities, excluding Gulf Power Co., near 33,883 MW compared to a forecast of this winter of 30,412 MW, more than an 11-percent increase.

"Previously, cold waves were an over-

Continued on page 6

Across the South, utility personnel scrambled recently to meet record demands as a cold front swept over large regions. This state-of-the-art control center helped Tampa Electric Co. manage soaring demand, but the utility, like others, had to institute rolling blackouts to maintain system stability.

ComEd rate hike nulled; Chicago threatens buyout

CHICAGO—Commonwealth Edison Co. officials—and state regulators—are reeling from a Dec. 21, '89, Illinois Supreme Court decision that reversed an Illinois Commerce Commission (ICC) six-year rate package.

The 1988 ICC decision gave ComEd a two-level, $480-million rate hike with a four-year freeze agreement.

"This decision really threw a lot of things up for grabs," said ComEd spokesperson John Hogan. "We had hoped to enter the new decade with this matter behind us."

In other, unrelated, news, ComEd officials can also expect to be busy with franchise negotiations with Chicago. The city recently announced intent to cancel its 42-year franchise agreement with the utility and threatened a buyout.

Continued on page 8

LATE NEWS

WEPCo vs. EPA—about binding life-extension projects to New Source Performance Standards—was decided Jan. 19 by the 7th U.S. Court of Appeals. Arguments were upheld on both sides. No decision was made yet on the delayed Port Washington Power Plant renovation.

Niagara Mohawk Power Corp.'s Nine Mile Point One nuclear plant reloaded fuel in early January.

Richard Snell takes over for Pinnacle West Capital Corp.'s retiring Chairman, President and CEO Keith Turley on Feb. 5.

PWCC turns away PacifiCorp's offer, seeks 22% rate hike

PHOENIX—Soon after Pinnacle West Capital Corp. (PWCC) turned down PacifiCorp's revised $2.08 billion offer for the financially troubled company, its Arizona Public Service subsidiary asked state regulators for a 22-percent, three-year rate increase.

The increase seeks to put costs from Palo Verde 3 nuclear unit and coal-fired Cholla 4 into the rate base.

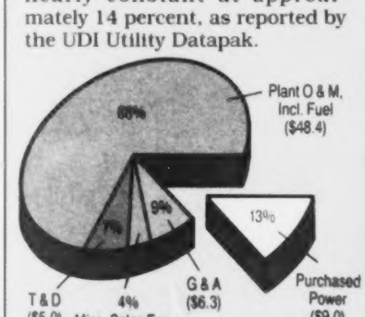
Regulators and PacifiCorp officials expressed disappointment at PWCC's moves and encouraged PWCC to reconsider the merger offer. PacifiCorp promised to hold rates to an 8-percent in-

Continued on page 8

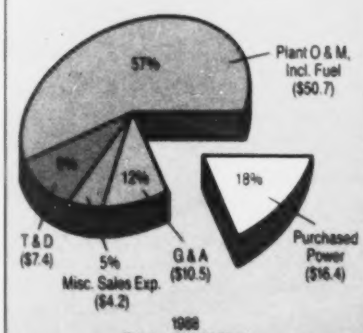
ELECTRIC UTILITY OPERATION AND MAINTENANCE EXPENSES

($billion)

The percentage of operating and maintenance costs attributable to purchased power by 150 U.S. electric utilities is climbing, according to information supplied by the Utility Data Institute based on its database. Yet as a portion of total energy distributed, the number of purchased megawatthours has remained nearly constant at approximately 14 percent, as reported by the UDI Utility Datapak.



1982
(Total = $71.4 billion)



1988
(Total = $89.2 billion)

NEWS BRIEFS

JILL MINNER, Special Projects Editor

Battelle forecasts 1990 R&D expenditures

In its annual forecast, Battelle expects 1990 research and development expenditures in the United States to reach $138.7 billion. This figure shows a $6.3-billion, 4.8-percent increase over the National Science Foundation's estimate of $132.4 billion actually spent for R&D in 1989, according to Battelle. A real increase in 1990 R&D expenditures of approximately 2.1 percent is also predicted by Battelle. "With significant global changes occurring in both the political and economic environment, we have every reason to expect that there will be continuing reallocation and reevaluation of R&D resources," explained Battelle President and CEO Douglas E. Olesen. "These changes offer both challenges and opportunities, and it remains for the R&D community to develop innovative ways of applying its store of strong and diverse talent," he added.

Massachusetts DPU proposes pacesetting regulations for utilities

The Masschusetts Department of Public Utilities recently proposed regulations for electric utilities to follow when planning for their future energy needs. "This proposal sets out a more effective way for the state to ensure that adequate resources are in place to meet anticipated demands for electricity," explained DPU Chairman Bernice K. McIntyre. The DPU proposed the following regulations: inclusion of environmental considerations in the criteria used to select resources; coordination with the Energy Facilities Siting Council; pre-approval of contracts for new generating facilities or for conservation and load management; and flexibility for utility companies in deciding which resources to use to meet energy needs of their customers. Public hearings on the proposed regulations will begin Feb. 28, 1990, and final comments are due ten days after the close of the hearings.

Idaho Power says rates too low for customers to receive credits

According to Idaho Power Co., its rates are so low that its customers don't qualify for credits under the Residential Exchange Program. The program is part of the Northwest Power Act which was designed to spread benefits of the Northwest's low-cost federal hydro power to customers served by private utilities. Idaho Power customers did not receive any of the $26.9 million that the Bonneville Power Administration said it paid during 1989 to Idaho residents served by private utilities. The utility said it has dropped from the program since Idaho Power customers would not receive benefits during the life of the agreement.

Conference Board's Outlook Panel predicts labor shortages in 1990

The Conference Board's Human Resources Outlook Panel has predicted that the U.S. economy will avoid a recession in 1990, but that companies will face widespread labor shortages and will be forced to hire people they would not have hired before. The panel, which includes ten labor experts, also projects that wages and salaries in private industry will increase by an average of five percent this year. Other panel predictions for 1990 include: unemployment will average 5.3 percent; the rate of inflation will average 4.5 percent; labor costs per unit of output in manufacturing will rise by about 2 percent; and manufacturing productivity will advance by about 3 percent.

Hydro flow rate case to be reviewed by U.S. Supreme Court

The U.S. Supreme Court has agreed to review a case that may have a strong impact on hydro project owners, according to the American Public Power Association. The case, which questions who has the authority to set hydro project flow rates, involves the Federal Energy Regulatory Commission, the state of California, and a 3-MW hydro project on Rock Creek. FERC specified interim water flow rates for the project in April 1983. However, in February 1984, the California State Water Resources Control Board issued a permit for the project reserving jurisdiction to set permanent rates. APPA said the 9th U.S. Circuit Court of Appeals later upheld FERC's jurisdiction.

NARUC publication helps consulting firms with utility audits

The National Association of Regulatory Utility Commissioners said it has released a publication, *Consultant Standards and Ethics for Performance of Management Analysis*, to guide consulting firms on the special circumstances of a utility audit. According to NARUC, consultants contracting with public utility commissions and/or utilities would benefit from the 16-page report. The report is broken down into three parts: Part A discusses general standards for a management audit of a utility; Part B covers the examination itself and workpaper standards; and Part C discusses reporting standards. For a copy of the report, which costs $6.50 per copy, contact NARUC, P.O. Box 684, Washington, DC, 20044.

EARTHTECH '90 to focus on environmental problems and solutions

A large-scale technology fair and international policy forum, EARTHTECH '90, will be held April 4-8 in Washington, DC. Created by Sens. John Heinz (R-Pa.) and Al Gore (D-Tenn.) and the Environmental and Energy Study Institute, the event is designed to encourage solutions to global environmental problems. The fair will allow corporations, government agencies, and small entrepreneurs to showcase existing and new technologies, products and strategies for environmentally sustainable development. The forum will include discussions by corporate leaders, government policy makers, and public interest representatives on ways to accelerate innovation and bring environmentally sustainable technologies into widespread use.

EEMI helps engineers, managers with energy, environmental issues

The Association of Energy Engineers has announced the formation of the Environmental Engineers & Managers Institute (EEMI). The institute aids engineers and managers by covering environmental and management issues, and providing a forum for the exchange of technical, legal and managment information in all segments of the market, according to AEE. Subjects covered in EEMI programs include: global warming and its effect on energy programs; ozone depletion and CFC limitation; underground storage tanks and spill prevention; water and air pollution; waste to energy; toxic substances; sludge; radiation; and asbestos removal. For membership information contact: AEE Environmental Engineers & Managers Institute, 4025 Pleasantdale Road, Suite 420, Atlanta, GA, 30340.

ASME names president

The American Society of Mechanical Engineers has chosen Arthur E. Bergles to serve as president starting in June 1990. Bergles is Rensselaer Polytechnic Institute's Dean of Engineering, and has been an active ASME member since he was elected a Fellow in 1979.

Westinghouse acquires LN Technologies Corp.

According to Westinghouse Electric Corp., it has acquired the assets of LN Technologies Corp., a provider of chemical decontamination and low-level radioactive waste processing services for the nuclear power industry. "LN Technologies provides the most widely accepted chemical decontamination services in the industry. In addition, its radioactive waste processing capabilities are an excellent complement to our existing products and services in this area," stated Thomas A. Christopher, general manager of the Westinghouse nuclear services division. Westinghouse said it plans to consolidate the product lines with existing service activities offered by its nuclear services division.

PG&E wins award for equal employment

The U.S. Department of Labor honored Pacific Gas and Electric Co. with its 1989 Opportunity 2000 Award. U.S. Secretary of Labor Elizabeth Dole presented PG&E President George A. Maneatis with the award, in recognition for the utility's national leadership in affirmative action and equal employment opportunity programs. The utility said it spent over $1.3 million in 1989 on more than 50 outreach, educational and employee empowerment programs. "We are convinced that this investment in equal opportunity pays high dividends in the health and vitality of the communities we serve. And when communities prosper, business prospers," stated Maneatis.

MGE offers energy conservation rebates

According to Madison Gas and Electric Co., all of the businesses it serves are now eligible for new energy conservation services and incentives, including cash rebates. Rebates are available for improvements in lighting, water heating, electric motors, space-heating equipment, refrigeration equipment, air conditioners and more. MGE said incentives cover about 25 to 50 percent of the project materials and installation costs.

Utilities fined by NRC

The U.S. Nuclear Regulatory Commission recently proposed the following fines:

Consolidated Edison Co.

A $50,000 fine for failure to promptly correct a weakened emergency preparedness plan at the Indian Point 2 plant.

Duke Power Co.

A $50,000 fine for alleged violations of NRC security requirements at the Catawba, McGuire and Oconee nuclear power plants.

Florida Power Corp.

A $50,000 civil penalty for alleged violation of NRC requirements at the Crystal River nuclear power plant.

Northern States Power Co.

A $3,750 fine for violations of NRC security and reporting requirements at the Monticello nuclear power station.

Washington Public Power Supply System

A $50,000 fine for alleged violations of NRC requirements involving the procurement program for the Washington Nuclear Project No. 2.

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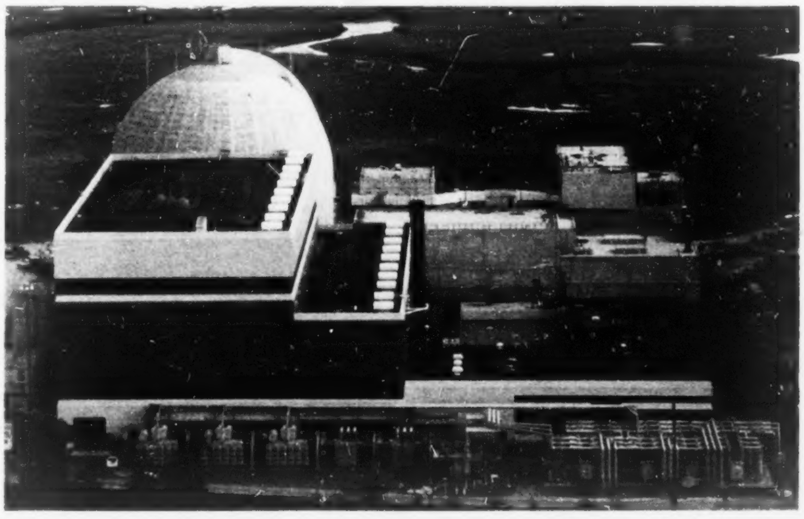
Stockholders vote on NU's PSNH buyout; Seabrook is ready



Seabrook plant operator—New Hampshire Yankee—told the Nuclear Regulatory Commission officials that Seabrook is ready to go. The NRC had said the full power license could come soon after that Jan. 18 briefing. The long-delayed 1150 MW of capacity is sorely needed in New England

Legislature OK'd NU rate boost for PSNH Jan. 1

MANCHESTER, NH—Stockholders and creditors are now voting on the $2.3-billion Northeast Utilities Co. offer for Public Service Co. of New Hampshire.

PSNH customers already tasted the beginning of NU's plan after state lawmakers approved a seven-year rate increase. State regulators then approved an interim increase of 5.5-percent that became effective Jan. 1. The New Hampshire Public Utilities Commission is working out details on seven years of such increases with a three-year freeze after that. Both PSNH and NU representatives are fairly confident the rate plan will go through.

On Jan. 19, stockholders and creditors were mailed ballots on the NU offer that would make PSNH an NU subsidiary. Their deadline for response is March 7. With approvals, confirmation hearings on the offer should begin at the PSNH bankruptcy court on April 4.

NU is seeking Federal Energy Regulatory Commission and Securities and Exchange Commission approvals.

FERC intervenors are expected to voice concern over transmission issues and "open access." The industry may see a second wheeling agreement, as FERC required of PacifiCorp when it acquired Utah Power & Light Co.

Approval will be needed from the Nuclear Regulatory Commission because the operating license of Seabrook would change from PSNH to NU. NU seeks to set up three subsidiaries, said company spokesperson Jeffrey R. Koktin.

PSNH would retain its name as a subsidiary. Northeast Utilities Operating Co. would operate Seabrook, and North Atlantic Energy Corp. would own the PSNH share of Seabrook.

The plant now awaits full-power operation under a PSNH division called New Hampshire Yankee (NHY).

A majority percentage of Seabrook owners would have to approve an operator change. NU seems confident about that—after the PSNH buyout it will own about 40 percent (see related story).

NU is no stranger to nuclear operations, already owning 44 percent of Connecticut Yankee and 65 percent of Millstone 3, and operating both plants. NU also operates Millstone 1 and 2.

The buyout plan includes employment and benefit guarantees for 18 months for all PSNH employees except the top 60 managers and the top five executives (and NHY division personnel who are employed by the joint Seabrook owners.) The top five PSNH executives would resign upon confirmation and the top 60 would know their job status within two months of confirmation, said PSNH's Nicholas Ashooh.

If everything goes as scheduled, stockholders and creditors will own the company in May or June as a result of the bankruptcy reorganization, Ashooh said. They would execute an agreement with NU to manage the company until final buyout approvals are secured. Koktin said NU hopes to own PSNH by the end of July.

On Dec. 13, 1989, the PSNH board endorsed the NU proposed acquisition after several weeks of intense negotiation between managements at both companies (*EL&P*, Jan., p.1). Creditors' and stockholders' representatives had previously agreed to NU's boosted bid. PSNH management long-hoped to remain independent.

Under the current NU plan, PSNH secured creditors would receive all the principal and interest owed them. Unsecured creditors would receive all the principle and all the interest up until the time of filing, plus about one-third of the interest accrued since the bankruptcy protection filing.

Equity holders—preferred and common shareholders—will get a combination of cash and securities with total value of $430 million (about $3-4 per share, Koktin said), if Seabrook operates and $205 million less if it doesn't.

Equity holders also get opportunities to buy a total of 8.4-million shares of NU stock for $24 each for up to five years. NU is now trading at $22.

NU's orginal PSNH bid was $1.9-billion. United Illuminating and New England Electrical System also had placed bids (see *EL&P*, Dec.'89, p.3). NU first expressed interest in purchasing PSNH assets in March '88. In July '89, NU reached an agreement in principle with the state to maintain PSNH rates about equal with inflation for seven years.

PSNH has been reorganizing under bankruptcy protection since January 1988 due to non-payment of debt from a 36.5-percent share of the Seabrook nuclear plant.

Hartford, CT-based NU is New England's largest utility system serving about 1.25-million customers in Connecticut and western Massachusetts. PSNH serves about 365,000 customers covering 75 percent of New Hampshire.

See also a story on PSNH cost cutting and efficiency, p.27.

In an unrelated development, George Branscombe, vice president and treasurer, is now heading the reorganization, having succeeded Charles Bayless as PSNH senior vice president and chief financial officer. Bayless is now Tucson Electric Power Co.'s senior vice president and chief financial officer.

Pittston, UMW expect end to 9-mo. coal mine strike

GREENWICH, CT—By the end of January, Pittston Co. and United Mine Workers expect a vote from the union rank and file on an agreement that could end a bitter nine-month coal-mine strike against the company.

If the 1900 striking miners agree to the settlement, Pittston will likely see higher productivity than companies that settled when UMW negotiated a 1988 contract. Striking Pittston mines stayed open, although output fell and some customers bought elsewhere.

Both sides agreed to silence on contract details until after the vote. Speculation on details has been widespread since the tentative settlement was reached Dec. 31, '89.

Talks had stalled due to differences about health benefits, pension plans and job security measures. Pay was not an issue. Both sides had hoped to provide incentives to increase miner productivity.

Although sympathy strikes, violence and related work stoppages did disrupt some supplies, it was not enough to hamper utility coal supplies (see *EL&P*, Aug.'89). These labor actions were at Eastern mines, affecting as many as 50,000 miners in nine states.

"I think everyone will be surprised," said Pittston spokesperson W.J. Byrne about the speculation on the contract.

He called it a "win-win agreement," adding that both sides the decision to be ratified. "It's a new way of doing business in the '90s," Byrne added.

Various analysts estimated Pittston's losses from the strike at $60 million, but Byrne said the number is more like $30-40 million.

Boston Ed settles some Pilgrim suits

BOSTON—Boston Edison Co. settled litigation with three of 16 wholesale customers relating to BE's 32-month Pilgrim Nuclear Power Station outage.

With previous settlements with other customers, BE listed a $100-million after-tax charge against 1989 fourth-quarter earnings. Because of a $70-million reserve set aside for additional settlements, the year-end charges total $170 million, resulting in a year-end loss, BE reported. The utility cut its quarterly dividend from 45.5 cents to 35 cents.

The Jan. 1 agreement settles matters with Commonwealth Energy System's Commonwealth Electric Co., Montaup Electric Co., and Municipal Light Board of Reading, MA.

The contracts, in place since 1972, require the purchasers to pay proportional shares of Pilgrim's operating and capital costs. In 1987, these customers filed complaints with FERC seeking termination of contracts and damages.

In addition to a revised contract, the companies also receive money for replacement power and court costs.

Approvals from the Federal Energy Regulatory Commission and the state Dept. of Public Utilities are expected.

Long-stalled nuclear plant is ready to go

SEABROOK, NH—The Seabrook nuclear power plant operator, New Hampshire Yankee, was expected to tell Nuclear Regulatory Commission officials that their long-delayed nuclear power plant is ready to go, at a Jan. 18 briefing at NRC headquarters in Rockville, MD.

NRC officials said a vote on a full power license would come at a later meeting, possibly by the end of January.

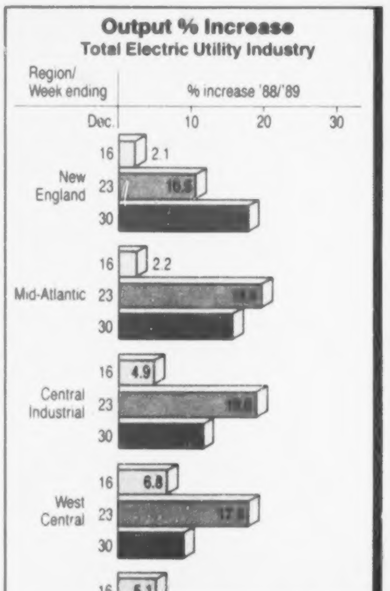
But even if found structurally and operationally sound, the politically embattled plant may face further delay. The Massachusetts attorney general is likely to seek a last-minute court stay of the license through the U.S. Appeals Court in Washington.

State leaders in Massachusetts have long opposed the plant, saying that the portion of the 10-mile emergency preparedness zone in Massachusetts could not be safely evacuated.

Construction on the 1150-MW reactor began in 1976. It has cost a consortium of utilities more than $6.35 billion; over one-third of that is interest. The NRC granted the low-power license in May 1989. NHY officials hope to be producing electricity within the first quarter.

The 11 owners include: PSNH with 35.6 percent; United Illuminating Co., 17.5 percent; EUA Power Corp.(Eastern Utilities Associated), 12.1 percent; Massachusetts Municipal Wholesale Electric Co., 11.6; New England Power Co., 10 percent; and Connecticut Light & Power Co. (Northeast Utilities), 4.05 percent.

Cold snaps; demand soars



Source: EEI's Electric Output

COMMENTARY

No more Seabrooks, please...

The prospect of the Seabrook Nuclear plant finally starting up—after 14 years of bitter debate and countless delays—is heartening to the entire electric utility industry. Many utilities have suffered right along with Public Service Co. of New Hampshire, albeit at a distance...a case of being tarred with the same brush! If there is to be a nuclear future for this industry, it would seem that the Nuclear Regulatory Commission should find a way to ensure that the kind of disasterous administrative and judicious delays that have battered PSNH aren't allowed to happen again...ever.

Seabrook's delay in coming on line, and costs that skyrocketed to $6.3 billion-plus, pushed PSNH beyond the financial breaking point, bankruptcy and reorganization under Chapter 11 protection. It thrust financial hardships and regulatory pressures on other Seabrook co-owners. Other utilities completing nuclear plants also incurred delays and added costs because of the ripple effect of Seabrook.

Now the prospects appear good for Seabrook to receive its full-power license ...perhaps by the time *EL&P* subscribers read these observations. But it's far from sure. There still remains the potential for Massachusetts Attorney General James Shannon to seek a further delay to operation of the plant through the U.S. Court of Appeals in Washington.

Therein lies the continuing rub...and the problem that NRC must solve. At every turn, Massachusetts officials have done whatever they could to delay Seabrook. Never mind that the State of New Hampshire had given its approval, and accepted the minimal risk acknowledged by scientists and regulators. Never mind that the most comprehensive and stringent efforts had been extended into researching, designing and engineering the comprehensive safety measures engineered into the plant, safety procedures and systems subsequently subjected to minute, in-depth inspection, tests and evaluation by the most qualified scientific and engineering minds available. Never mind that emergency plans meeting NRC criteria were developed by the Seabrook emergency planning team, despite Massachusetts state and local officials' refusal to participate in those studies and plans.

The delays brought about by Massachusetts officials will be paid for by New Hampshire ratepayers for decades. The increased costs of the power from Seabrook, power desperately needed in New England to meet steadily increasing demand growth, also will be paid for by residents of other New England utilities. In capital-intensive projects such as this, delays impose severe financial burdens, and, in the worst case, lead to abandonment.

Some way must be found to prevent such dilatory tactics from occurring again. If delays are necessary, procedures should be developed to make those responsible for the delays financially liable for the increased costs if it's determined that their objections are without merit. It has been too easy to intervene and to halt progress of a project on the basis of even the most illusionary "threats of danger" or other possible negative factors.

One-stop licensing is held out as an almost magical way to renew the nuclear option. But without rules that make intervenors financially responsible for the effect of their actions, even this may not be enough.

The industry can't afford another Seabrook. New Englanders, thanks to Massachusetts, will be hard-pressed to afford the one they've got.

Robert A. Lincicome, Editor-in-Chief

Good investments deserve to earn

Commonwealth Edison Co. has long drawn heavy criticism for building 12 nuclear units that currently supply 70 percent of its customers' electrical needs. Most recently, CECo suffered severe setbacks in implementing rates for its last three nuclear units, $7.1 billion in investments (see p.1), despite a hard-fought compromise plan by regulators.

While ComEd's nuclear program has created some of the highest rates in the country now, it has ensured an adequate energy source when other areas of the country are capacity short. In addition, if stringent Clean Air legislation is implemented, ComEd may laugh all the way to the bank. It could then sell clean nuclear-generated power to Midwest utilities faced with the possible alternative of installing high-cost scrubbers on old coal-fired units.

Mark T. Hoske, News Editor

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LETTERS

A few good (oops) men

I really look forward to reading your magazine every month. The subject material is well chosen for interest and use, the writing is excellent and the presentation is inviting.

I was surprised to find commentary of this type [See "Call for papers," Nov. *EL&P*, p 22c, subheaded "A few good men," in which the desire of the Cogeneration & Small Power Production Technical Committee of ASME to attract more "people" (meaning men and women) was described.] and, as one might expect, was not pleased!

Denise Margaret Zurn, P.E.
Minneapolis, MN

Editor's note: Ms. Zurn was first, but far from being alone in calling our attention to the now inappropriate use of the term "men" instead of a more non-sexist term, such as people or engineers. Ah, we try...but we're mere mortals and too often err. Apologies to all our feminine readers.

Who has the guts to do what?

Editor's note to "A Supplier:" We would be happy to publish your letter, in which you questioned if we had the guts to publish your comments, had you only displayed the similar intestinal fortitude to sign your name. While we will withold publishing the name of any letterwriter upon request, we will not print letters from anonymous sources.

Greenhouse effect?

Pop the top on an ice-cold can of beer and there's a nice crisp spritz. Pop the top on a can of beer that's been sitting in the car trunk on an August day and there will be a not-so-unexpected beer shower. Why? Carbon dioxide is not as soluble in warm liquid as in cold.

Set a pan of water on a stove burner to boil and, as the water heats up, visible vapor appears above the water's surface.

Scientists have discovered that atmospheric gases trapped in thousand-year old ice may have a lower concentration of carbon dioxide than at present. Many claim that the earth was cooler [then] because there was less CO_2 in the atmosphere and hotter now because there is more. However, like the chicken or the egg, which came first?

If the earth is cooler, more CO_2 will be absorbed in the oceans and less will be [present] in the atmosphere, as found in the ice packs. The amount of cloud-forming vapor also will be lower, letting in more warming sunlight. As the earth begins to warm up, heat-trapping CO_2 concentrations increase, but earth cooling water vapors also increase. The earth will heat or cool until it reaches a natural equilibrium, even if that is comparable to Venus or Mars. This greenhouse cycle can be and has been interrupted by other natural occurences: the Apollo asteroid that chilled out the dinosaurs, Krakatoa and Mt. St. Helens, the Tunguska comet, the Yellowstone fires, nuclear war. But once the dust settles, the laws of physics and thermodynamics remain unchanged.

If increasing CO_2 levels are the cause, and not the result, of atmospheric heating, man's five-billion ton annual production is negligible in a 6.5 million billion ton atmosphere. With a 50 percent recycle rate by vegetation and ocean, man's contribution is only 40 percent of the one part-per-million trend detected at the Mauna Loa test site. So where is the rest coming from and how are we going to stop it? The quadrillions of energy Btus converted to useful and useless purposes, all of which heat up the atmosphere, could account for half the temperature rise. *Changing energy sources won't change that* [emphasis provided]!

Is the earth heating up? Could be, but so what? Tree-ring records show the earth has heated and cooled for thousands of years. Geological and fossil records show the earth has heated and cooled for millions of years without the help or hinderance of fossil fuel burning, forest clearing or industrialized man.

Two special interest groups have lined up on Capitol Hill: government-grant professionals waiting to stay comfortably employed, and coercive utopians seeking to put us all in solar homes, on bicycles and off Argentinian beef. Our elected representatives, who have mucked up everything they have touched for 200 years, now are going to prove their worth by squandering our tax dollars trying to control the weather. Ozone holes, global warming, the greenhouse effect, fossil-fueled carbon dioxide and man's ability to damage and repair the atmosphere are collectively the biggest carnival hustle and snake-oil promotion since a geocentric universe spun around a flat earth.

This entire issue revolves around man's enormous ego, a belief that his meaningless existence on this little dust ball in space has some sort of cosmic importance. Nature would gladly stop by and, with total regard for government regulations and programs, pinch off all our pointy heads with nary a backwards glance.

Nick Schroeder, P.E.
University of Colorado
Boulder, CO

JPGC comment and report

Two articles which appeared in the December 1989 edition of *Electric Light & Power* cannot escape comment. I am referring to an article entitled, "JPGC Breaks Little New Ground," which appeared on page 16 and the follow-up article appearing on page 19 entitled, "Power-Gen '89 Opens December 5 in New Orleans."

Just to set the record straight: the Joint Power Generation Conference has a long-standing tradition and reputation for excellence in the content of its technical program. Sponsored by the ASME and IEEE, the technical information presented at the JPGC is developed by industry professionals, reviewed by members of the sponsoring societies, and represented to the technical community at minimal cost to those in attendance.

The content of the 1989 JPGC and the 20 or so previous JPGCs represent the best available technical information from over 200 authors. All of the papers are contributed by professionals in the field of power generation facilities design, operations and maintenance. Countless other power industry professionals participate in the topic selection, paper reviews and conference arrangements.

The Joint Power Generation Conference sponsors papers on all phases of the power generation field.

To imply that the content of the JPGC in 1989 or any other year is not all inclusive of the power generation industry or is less than timely, is editorializing in the guise of reporting the news.

Continued on page 20

How NUG capacity is growing

Jean-Louis Poirier
Senior Vice President
RCG Hagler, Bailly Inc.

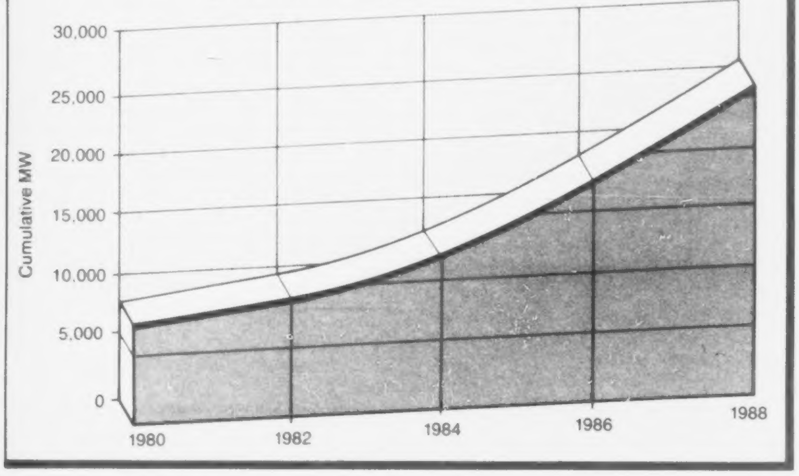
In the last 10 years, almost 2500 non-utility generation (NUG) plants mushroomed up in the United States. These plants, which are not ratebased, include self-generation plants, qualified facilities (QFs) and independent power projects (IPPs).

These and future NUG power plants will provide some 45 percent of the new generation capacity to be built in the U.S. over the next seven years.

Self-generation plants are built by industrial or large commercial users to meet their onsite power needs and generally do not interface with the power grid unless it is on a seasonal basis.

QF projects, in contrast, sell power to the grid under long-term contracts at rates negotiated with the buying utilities and approved by state regulatory commissions. QF owners are not, however, regulated as utilities, if they satisfy the size and fuel conditions of the 1978 Public Utility Policy Regulatory Act (PURPA). QFs must be either qualified cogeneration faciltities (of any size or fuel as long as they produce at least 5-percent useful steam) or small power projects that use alternative sources of energy and are in sizes below 30 MW (normally) or 80 MW (depending on fuel; e.g., 80 MW for culm or municipal solid waste).

Figure 1. Non-Utility Generation Growth



IPPs are a newer type of NUG project that do not meet the PURPA conditions but still escape utility regulation through specific exemptions of the Public Utility Holding Company Act that are granted by the Securities & Exchange Commission.

RCG Hagler, Bailly estimates that 31,000 MW of new NUG capacity will have been developed between 1988 and 1996. The projects will be diverse in terms of size, fuel and ownership. To build this, a new power industry will emerge that will be a mix of both non-utility entities and unregulated subsidiaries of electric utilities.

Table 1. Non-Utility Generation (August 1989)

Primary Energy Source	Projects	Capacity (MW)
Natural Gas	902	12,685
Oil	43	412
Coal	82	3,854
Waste Fuel	50	1,904
Wood	137	2,379
Agricultural Waste	21	181
Biomethane	98	481
Other (hydro, MSW, solar, wind)	1,121	5,955
Total	2,454	27,851

Current situation

NUG power has grown by 15 percent annually since 1980 (see Fig. 1). After a timid start between 1980 and 1983, when annual NUG capacity additions slowly grew from 600 to 1300 MW, the market took off in 1985 when capacity additions neared 3000 MW. Since then, between 3000 and 4500 MW have been added each year. Overall, NUG plants have provided 15 percent of the power generation added in the U.S. since 1980.

At the end of August 1989, 27,851 MW of NUG capacity was in-place, with an annual production of 145,000 GWh, about half sold to the grid. The majority of that capacity, over 19,000 MW, is made up of QF projects. IPP projects are few, with only three operating (totaling 1058 MW). There also is some 7600 MW of pre-PURPA, self-generation capacity.

Current fuel mix

NUG projects use a variety of energy sources (see Table 1) in eight categories: natural gas, oil, coal, waste fuels, wood, agricultural waste, biomethane and others (such as solar, hydro, wind and municipal solid waste).

Gas-fired plants dominate, with 45 percent of the operating NUG capacity. Next come facilities burning coal (bituminous, subbituminous, lignite and anthracite) or wood (wood chips, bark and sawdust). Together, they account for 22 percent of the NUG market.

While most wood projects are between 10 and 25 MW, coal projects tend to be between 30 and 50 MW. Waste-fuel-fired projects come in fourth, with 7 percent of the total capacity, thanks to a fairly large average project size (around 40 MW). Waste fuels include petroleum coke, refinery gas, coal mine waste, anthracite culm, coke-oven gas and blast-furnace gas.

The balance of the NUG universe consists of some 1240 smaller projects (totaling 6600 MW) that use hydropower, municipal solid waste (MSW), solar and wind power, geothermal, agricultural waste, and biomethane. This includes some 1400 MW of hydropower, 1200 MW of MSW, 1000 MW of wind and solar, and 760 MW of geothermal projects.

In the last three years, the proportion of new gas-fired capacity stabilized between 48 and 52 percent of total new NUG capacity installed each year (see Fig. 2). At the same time, the proportion of coal projects decreased from 18 to 10 percent. The proportion of MSW averaged 7-8 percent of annual NUG additions, and the share of solid non-MSW projects rose steadily.

Regional developments

NUG power has developed unevenly across the United States, independent of the distribution of existing population or electric loads. To date, two regions have captured 58 percent of total NUG capacity in-place. First, the West-South Central Region (basically Texas) claims nearly 8960 MW of NUG plants, a large part as petrochemical cogeneration plants. Second, the Pacific Region (95 percent of which is California) has about 6800 MW of the capacity, including large cogeneration facilities for enhanced oil recovery fields and many smaller geothermal, wind, small hydro and wood-fired projects.

Table 2. Fuel Distribution of Non-Utility Generation (% - August 1989*)

Region	Natural Gas	Oil	Coal	Waste Fuel	Biomass
West-South Central	86	—	1	10	3
Pacific	73	2	4	5	16
South Atlantic	7	—	54	9	30
Mid-Atlantic	46	4	26	18	6
New England	17	10	2	—	71
East-North Central	16	7	47	17	13

*Excludes Hydro, MSW, Solar and Wind

Both regions have been active through 1988. Over 1200 MW came on-line in 1987 in the West-South Central Region alone, and the Pacific Region experienced a record in 1988 when 1800 MW of new NUG power hit the grid. These two regions are, however, entering a phase of partial cooldown.

Now other regions are entering the picture more strongly. The South Atlantic Region ranks third, with 3300 MW of NUG capacity in-place in Florida, North Carolina and, more recently, Virginia. Lately, the Mid-Atlantic and New England Regions also have become active in the field. In contrast, the East-North Central Region, with only 1655 MW of mostly industrial-based cogeneration, has not been very active.

With different levels of market development across regions come different fuel mixes (see Table 2). Natural gas-fired capacity dominates the NUG market in the West-South Central and Pacific Regions, while coal's share in the South Atlantic and East-North Central Regions exceeds or is close to 50 percent. New England exhibits the greatest proportion of biomass facilities (71 percent), while the Mid-Atlantic Region shows a balance among gas, coal and waste fuel projects.

Current NUG industry

The current industry is diversified. The RCG Hagler, Bailly database identifies some 150 active players, including 55 project developers, 40 electric and gas utility subsidiaries, 25 equipment suppliers, 15 architect/engineering and construction companies, and 15 gas or coal suppliers. The analysis reveals that the 10 largest players control 40 percent of the action and the next 10, another 26 percent. The largest players have positions in 25-30 projects with a total capacity over 1500 MW.

In spite of strong capacity growth, the NUG power industry faces several challenges. First, it still needs to establish a track record in terms of project completion and capacity availability.

Second, NUG producers are struggling to get customers to accept a greater share of risks. The producers often are being asked to supply availability and heat rate guarantees while being dispatchable, providing subordinated debt, and, naturally, remaining the cheapest power supplier.

Consequently, NUG plant owners have taken risks on solid-waste facilities, wood-fired small power plants, landfill gas recovery and waste-coal projects. Problems are accentuated as NUG companies deal with a diverse slate of technologies, some of them as innovative as fluidized-bed combustion. The risk of hefty write-offs can quickly cause problems if NUGs become technology provers at a time when increasing competition rules risks out.

Next, NUG companies have to equip themselves with a qualified staff, including regulatory intelligence analysts, site specialists, transmission engineers, environmental specialists, and O&M trainers.

Finally, the industry is learning how to grow. Several companies are groping for ways to smooth the transition between current project portfolios of 250-300 MW and those approaching 1000 MW. In some cases, this means an annual revenue growth in excess of 35

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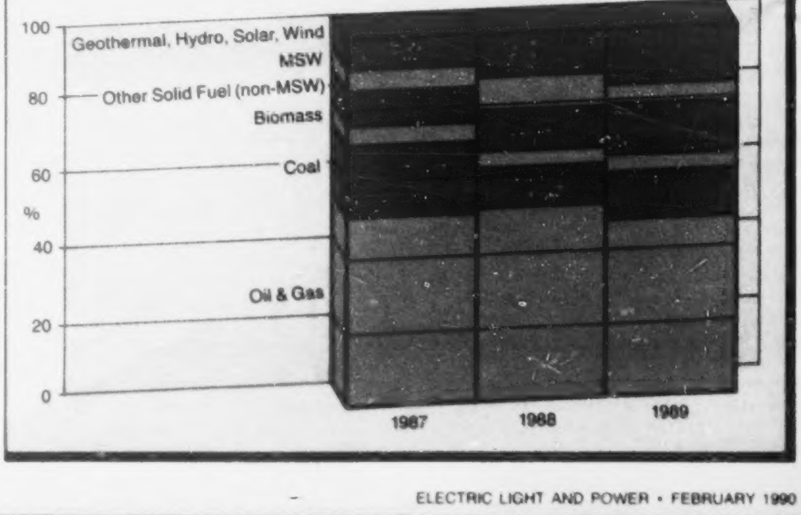
Figure 2. Fuel Mix of Non-Utility Generation



Operating and maintaining cogeneration gas turbines

E.J. Walsh
M.A. Freeman
General Electric Co.

Focus
Non-Central Station Power

The cogeneration industry is approaching a significant O&M milestone this year. The first-generation gas turbine power projects are just about at the end of their first major maintenance cycle. As the next major cycle is entered, the effects of first-round maintenance strategy will become evident.

A review of O&M practices for heavy-duty gas turbines at cogeneration plants is now due, with the emphasis on the types of inspections, plus operating factors that influence maintenance schedules.

Advanced planning for maintenance is a necessity where downtime must be kept to a minimum. Control of planned maintenance and inspection provides direct benefits in reduced forced outages and startup failures, which in turn, reduce unscheduled repair downtime. A typical maintenance program must include a variety of essential items.

Types of fuel—Fuels burned in gas turbines affect maintenance (See Fig. 1). A maintenance factor of one in the tables signifies costs normal for natural gas operation. The other factors are multiples of this base cost. Heavier hydrocarbon fuels frequently contain corrosive elements that can reduce combustion hardware life. The cleanliness of liquid fuels (i.e., lack of salt water, lead and dirt) also affects the life of gas turbine auxiliary components.

Making the supplier meet a fuel specification or establishing a regular fuel quality sampling-and-analysis program are just two of several options available to an owner to minimize or eliminate adverse effects of unclean fuel.

Fired hours and duty cycle—Interaction between the gas turbine system and other major subsystems—fuel delivery, controls, turbine nozzles, buckets, rotors—determines the operating state of the turbine unit and significantly influences turbine maintenance requirements. The load cycle of the gas turbine (see Fig. 2), up to its continuous-duty rating, has little effect on the life of parts, provided it does not undergo frequent and rapid load changes. The effect of rapid and frequent load changes on a unit is similar to the effect of frequent starts and stops.

Each start and stop subjects the hot-gas-path parts to significant thermal cycles. The gas turbine control system is designed to minimize this effect. However, starting and stopping a turbine frequently shortens part lives and results in maintenance intervals that are shorter than a similar unit in continuous duty.

In general, for units in continuous duty, the starting effects are negligible, since few turbines in this service see less than 150 hr of operation for each start.

Maintenance practices—As operating and maintenance data are accumulated on a specific application, the next step in a well-planned program of outage management should be inspection intervals. Inspection intervals for optimum turbine service are not the same for every installation. Rather, each user develops intervals through an interactive process based on past experience and trends indicated by the key turbine factors.

Replacement parts—Achieving minimum downtime requires that replacement parts, either new or reconditioned, be available.

Bolting—Typically, about 25 percent of the downtime required for a hot-gas-path inspection is consumed removing and replacing flange bolting. Therefore, using correct tools and techniques during maintenance, such as thread deburring and control of tightening torques, dramatically improves followon maintenance activities.

Air quality—Airborne contamination (dust, salt, etc.) can cause compressor blading erosion, fouling, corrosion of components in the hot-section parts, and consequent reduction of lives of the parts.

A corrosive atmosphere can have a noticeable impact on compressor inlet guide vanes and compressor blade life. Annual inspection of the inlet areas is strongly recommended.

Compressor environment

The importance of inlet air quality can best be appreciated by considering that a gas turbine operating at a 12:1 pressure ratio ingests over 6000 fpm of air for every megawatt of power produced. Compressor degradation can occur from contaminants such as sand and mineral dust, which can cause blade erosion, fouling and damage from foreign objects.

Compressor fouling is often caused by ingestion of material that adheres to its components—material such as oil vapor, smoke, sea salt and industrial vapors. Axial-flow compressor deterioration is the major cause of loss in gas turbine output and efficiency. Typically, 70-80 percent of performance loss is attributable to fouling of compressor blades.

Fortunately, much can be done through proper O&M procedures to minimize such "recoverable" losses, such as effective compressor cleaning when needed (see Fig. 3), a well-maintained inlet-air filtration system, periodic inspection, and prompt repair of compressor blading.

Maintenance overview

Since maintenance costs and availability are two of the most important concerns to the owner, a rigorous maintenance program must be instituted that minimizes costs and maximizes equipment availability. For a program to be effective, the owner must develop an understanding of the relationship between his/her operating plans and priorities for the plant and the manufacturer's recommendations regarding number and types of inspections, spare parts planning, and major factors af-

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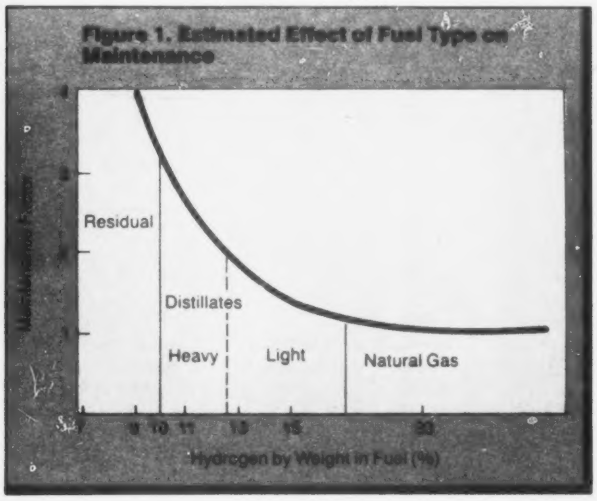
Figure 1. Estimated Effect of Fuel Type on Maintenance

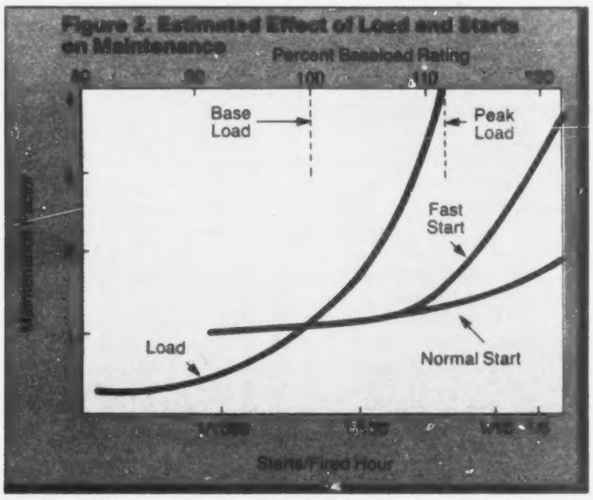
Figure 2. Estimated Effect of Load and Starts on Maintenance

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from page 22

NUG capacity...

percent over the next three years.

This puts substantial pressure on their managements, especially if any are public companies that have to live within the "fishbowl" environment of quarterly reports. As a result, most of these companies are reassessing their strategies in terms of project mix, geographic focus and roles to play.

Future NUG generation

The database shows that some 614 NUG projects (25,000 MW) are under development. Only half of these, however, are likely to be completed because many will not secure the right fuel, technology or financing. The industry, however, will respond and propose at least another 20,000 MW of capacity through 1996 to replace earlier casualties.

RCG/Hagler, Bailly projects a net addition of 36,100 MW of NUG power between 1990 and 1996, broken down as:

- Some 23,200 MW (nearly 69 percent) will be in the form of gas- or coal-fired industrial cogeneration projects, in standardized designs, in sizes between 50 and 150 MW. After peaking for the next 2-3 years, gas-fired NUG capacity will decrease in the mid-1990s when solid-fired capacity regains momentum as developers offer to sell "clean-burning" power.
- About 7400 MW will be small power projects burning, for example, waste coal, MSW, wood, tires or agri-waste.
- Between 17 and 20 IPP projects (5500 MW) will come online by 1996. During the next seven years, the IPP growth will be timid and primarily in eight states, mostly along the East Coast.

Focus
Non-Central Station Power

Capacity gap

By bringing nearly 750 new projects online by 1996, the industry will help fill the U.S. capacity gap. At the end of 1996, over 57,000 MW of NUG capacity will be in-place, producing nearly 280,000 GWh/year.

A growing NUG capacity means an increasing choice of power purchase options for utilities. NUG producers offer firm, more or less dispatchable power, in sizes from 10 kW to 500 MW.

Utility subsidiaries

The future growth of the NUG market will cause some companies to become large, with project portfolios of more than 2500 MW by 1996. By then, the five NUG leaders may together control over 16,000 MW. These industry leaders will each have annual revenues approaching the billion-dollar mark.

At the same time, there will be a lot of losers, and the industry will shrink from its 150 current players to less than 90 by 1996. To stay in the game, the average company will have to grow by 15-20 percent per year and control more than 500 MW of project equity positions by 1996.

Utilities will play an increasing role in the NUG industry through their unregulated subsidiaries that benefit from several competitive advantages. First, utility subsidiaries have access to impressive internal engineering, construction, procurement and regulatory talent that they can tap as needed.

Second, thanks to their parents, these subsidiaries have access to capital. Better front-end project development money is generally available to them, a most useful resource when responding to competitive bids. In the long run, utility subsidiaries may have the strongest staying power, have the best understanding of transmission issues, and offer the most natural fit for IPP projects.

As a result, utility subsidiaries may own up to 18,000 MW of NUG capacity in the mid-1990s. By the late 1990s, the largest utility players may control NUG project portfolios around 4000 MW. To strengthen their positions, the subsidiaries will purchase projects from non-utility developers up to the maximum allowed.

Eager utilities

Several utilities are anxious to get involved in the NUG business, and, although they will have to play catch-up, they can succeed as long as they strike the right business alliances and pursue projects that fit their skills.

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'New source' standards apply to renovations

Wisconsin Electric petitions for rehearing on Port Washington case

Mark T. Hoske
News Editor

MILWAUKEE—If a petition for rehearing fails in WEPCo vs. EPA, utilities choosing to renovate aging coal plants may be bound by New Source Performance Standards (NSPS).

Plant life extensions previously avoided NSPS. The precedent-setting, Jan. 19 decision by Chicago's 7th U.S. Court of Appeals centered on a proposed $71-million renovation of Wisconsin Electric Power Co.'s Port Washington Power Plant.

Wisconsin Electric Power Co.'s Port Washington Power Plant renovation awaits further discussion with the Environmental Protection Agency and a petition for rehearing. If the decision stands, the EPA is likely to hold similar life extension projects to New Source Performance Standards.

The decision tightens Environmental Protection Agency clean-air regulations and could double the price for similar renovations by requiring utilities to add emission-control equipment. Rather than perform these costly modifications, utilities may choose instead to close such plants.

Port Washington's fate is still uncertain. WEPCo is reviewing another part of the decision with EPA officials to see if the Port Washington renovation still would be cost-effective. There is no clear indication of when the request for rehearing or talks with the EPA would yield more information.

WEPCo's Jackie Olson explained that the utility asked the judges in the seventh circuit to review the decision that NSPS apply to the Port Washington project modifications.

On the related matter of Prevention of Significant Deterioration, the court agreed that the EPA had ignored Port Washington's operating history in measuring its total emissions over one year. Olson called this part a victory, adding that the EPA had based emission estimates on around-the-clock operation rather than operating history. WEPCo plans to meet with EPA officials to assure that operations at Port Washington fall within allowable PSD standards.

Renovation still questionable

The outcome of the discussion with EPA and the request for rehearing will determine if the Port Washington units will be renovated as proposed.

"We're pleased the court upheld the PSD decision. We think there's room for interpretation in discussions with the EPA. We're hopeful we can keep some, if not all of the plant operating," Olson said.

On the NSPS portion of the decision, "We're hearing from other industry sources that it will have broad application," Olson said. "We're equally concerned."

Proposed work

WEPCo's Port Washington plant renovation involves $71 million of work on turbine-generators, boilers, mechanical and electrical auxiliaries, and common plant-support facilities for all five units.

WEPCo argued that even though the renovations restore lost capacity, they would not extend the units past their original design life, and so should not be held to NSPS, according to Walter T. Woelfle, WEPCo counsel.

The utility proposed the renovation to state regulators in July 1987. The Wisconsin Department of Natural Resources asked the EPA to concur that the renovation work would not fall under NSPS or PSD regulations.

The EPA said in October 1988 that the renovation is subject to all Clean Air Act requirements. Efforts to work out the matter failed, and WEPCo later took it to court.

RESERVED FOR MAILING LABEL

Budget: DOE +6.4%; efficiency gains 78%; climate studies +57%

WASHINGTON—The Bush fiscal year '91 budget increases funding for environmental programs, efficiency, and global climate change study; and pushes budget balancing. Bush will ask for an NRC user fee hike to 100%.

Multi-agency funding for studying global climate change totals $1.034 billion, up 57 percent.

The Department of Energy budget request, $17.48 billion, is a 6.4-percent increase over fiscal year (FY) 1990. FY91 starts in October.

Public input at the National Energy Strategy (NES) hearings resulted in a 78-percent increase in the energy efficiency and renewable energy funding request; that's an 8-percent hike over the FY90 appropriation by Congress.

Listen to the people

Secretary of Energy Admiral James Watkins said that the energy hearings reveal "broad consensus for increased emphasis on energy efficiency improvements and renewable energy."

"This is a marked change in direction for DOE in this important area. Using energy more efficiently, and developing

Continued on page 4

LATE NEWS

Entergy's New Orleans Public Service Inc. agreed in principle to sell the gas and electric utility assets to the city. No details were available. A July '89 deal had fallen through.

California PUC Division of Ratepayer Advocates advised regulators to reject the proposed merger of SCEcorp and San Diego Gas & Electric, saying the level of ratepayer savings is questionable.

Pinnacle West Capital Corp. restructured $650 million in debt and signed an interim refinancing agreement skirting a Chapter 11 filing; federal regulators placed MeraBank into receivership.

Alternate acid rain proposal unites split industry views

WASHINGTON—One voice unites the industry in an alternate proposal to the Administration's clean-air legislation.

In a rare move, the Edison Electric Institute, American Public Power Association and National Rural Electric Cooperative Association endorsed a single alternate proposal, which relies on free-market principles, offers more flexibility, and costs less than President Bush's version.

How emissions are cut to target levels is the major difference in the proposal from legislation under consideration.

Too late for impact?

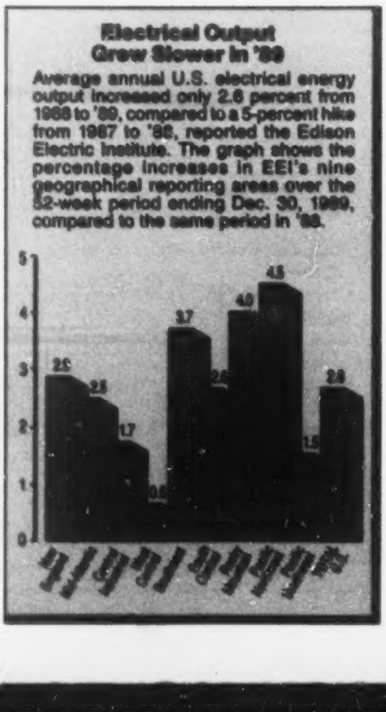
The compromise was drafted during the congressional recess. But some observers say this alternate proposal may have arrived too late in the process to have any significant impact on Congress. In its first day back, the Senate took up S.1630, its version of the Bush clean air proposal. House committees are entangled in the acid rain portion of H.R.3030, a point of debate since the fall of last year.

One congressional-committee aid called the proposal credible and viable, but said it didn't appear that it was being taken seriously as of mid-February.

The EEI/APPA/NRECA proposal offers more flexibility by allowing an averaging of emissions among utilities in three ways: 1) company-wide average; 2) statewide average; or 3) a holding company or power pool average.

Leaders of the industry groups for investor-owned utilities, municipal utili-

Continued on page 8



Electrical Output Grew Slower in '89

Average annual U.S. electrical energy output increased only 2.8 percent from 1988 to '89, compared to a 5-percent hike from 1987 to '88, reported the Edison Electric Institute. The graph shows the percentage increases in EEI's nine geographical reporting areas over the 52-week period ending Dec. 30, 1989, compared to the same period in '88.

NEWS BRIEFS

JILL MINNER, Special Projects Editor

KPL Gas reorganizes

KPL Gas Service said it has reorganized along a "line of business" format in order to make the company as customer and safety-oriented as possible. Under the reorganization, which went into effect this month, there are six main divisions: natural gas operations, electric operations, administrative operations, financial services, law, and communications. "With this line of business format, we are focusing authority so the president of each division is directly responsible for the operational people under him. There is no layer of management between. This narrows our focus and makes senior management directly responsible for providing the safest and most reliable electricity and gas to our customers," explained William E. Brown, newly appointed president and chief operating officer of the electric operations division. Others named to head the new divisions include: William L. Johnson, natural gas operations; A. William Woelhof, administrative operations; Steven L. Kitchen, financial services; John K. Rosenberg, law; and Edward H. Schaub, communications.

Met-Ed asks PUC to approve competitive procurement program

Metropolitan Edison Co. said it has asked the Pennsylvania Public Utility Commission to approve its pilot Competitive Procurement Program for buying additional non-utility generated electricity in the future, to meet growing demands. According to Met-Ed, the program would ensure that available power is purchased from "high-quality suppliers" at the lowest possible cost. Met-Ed said it would be the first electric utility in Pennsylvania to formally introduce competition into the electric power supply business. If approved, electricity would not be purchased under this program until the mid-1990s.

LCRA initiates refund of surplus revenues

The Lower Colorado River Authority (LCRA) was granted interim approval by the Texas Public Utility Commission to voluntarily refund $3 million to its wholesale customers. LCRA said the refund is unprecedented because it would be the first time a Texas utility, public or privately owned, has ever initiated a refund of unexpected excess revenues. The surplus of revenues was earned during recent record cold weather in December, according to LCRA. "This is a tremendous initiative for a utility to try and help its customers with the enormous electric bills that result from an extraordinary cold snap," stated LCRA General Manager David Freeman. "We wanted to prove that we mean it when we say we're a non-profit utility. The revenues earned during December were so far above cost or anything expected that to refund the extraordinary surplus, we feel, is the proper thing to do." LCRA said it has proposed a 10-percent credit for its customers against their December electric bills. However the city of Bastrop has objected to the distribution formula. The objection prompted the PUC's interim approval, to allow Bastrop more time to decide if it wants a full hearing on the issue. LCRA said Bastrop and other customers claim that they are entitled to a larger share of the refund due to their conservation efforts.

Oregon PUC literature keeps public informed

The Oregon Public Utility Commission said it is offering two new publications to help utility customers better understand how the rate-setting process works and how the public can learn more about the PUC. A fact sheet, "How Utility Rates are Determined," explains steps in utility rate cases, how the public may participate in rate cases, and what the commission considers when making rate decisions. The other publication, a Public Involvement Guide, provides an overview of the PUC's responsibilities, descriptions of publications available, and names and phone numbers of PUC departments and administrators.

NCA forecasts U.S. coal outlook for 1990

Electric Utility Statistics

	1987	1988	1989■	1990▲
Generation by:				
Coal	56.9	56.9	56.2	55.9
Oil/Gas	15.2	14.8	14.7	13.6
Nuclear	17.7	19.5	19.1	19.7
Hydro	9.7	8.3	9.6	10.4
Other	0.5	0.4	0.4	0.4
Electricity Growth Rate	3.4	5.0	2.0	1.6
GNP Growth Rate	3.4	3.9	2.9	1.7
Coal Consumption	718	758	763	772

Source: National Coal Association ■ Estimate ▲ Forecast

By the end of 1990, coal production will reach 997 million tons, 22 million tons higher than 1989 levels, according to the National Coal Association. In its annual forecast, NCA predicts that coal consumption at utilities will total 772 million tons, a 1.2-percent increase over 1989. The association also estimates that this year electric generation will increase by 1.6 percent, and that coal's share will drop slightly to 55.9 percent, due to the continued comeback of hydro generation and growth in nuclear generation. While nuclear's share is expected to reach at least 19.5 percent, oil's share will not be as high as it was in early 1989. Oil's high share was due to very low prices at the end of 1988 and the unavailability of nuclear power in the east, according to NCA.

Consumers Power says make hydro study part of relicensing process

Consumers Power Co. has proposed that a socioeconomic study into the impact of hydroelectric generating facilities on the public be included in the federal relicensing process. The utility, which has 11 hydroelectric plants up for new federal licenses, said it has submitted its proposal to the Federal Energy Regulatory Commission. "This is a major step in Consumers Power Company's effort to obtain new licenses for these hydroelectric plants," stated Gordon L. Heins, senior vice president for energy supply at Consumers Power. "By this step, we are saying that the impact these hydro facilities have on people—on their quality of life, their livelihood, their recreation, their communities—must also be considered as part of the overall licensing effort," Heins explained. The studies will take place in 1990 and will later be presented during public workshops in communities near the hydro dams, according to the utility.

Control Data renames energy mgmt. division

Control Data Corp. announced that it has renamed its energy management division Empros Systems International. The company said the changed name—which is ancient Greek for "out in front"—will enable it to enhance its identity, further strategic objectives, and maintain a leadership position as a supplier to the electric utility industry.

Applications available for Baldridge award

Applications are currently available for the 1990 Malcolm Baldridge National Quality Award, and the deadline for submitting applications is April 25, according to the Baldridge Award office. The 44-page booklet, "Application Guide 1990," contains a description of the award, an application form, instructions and recommendations for applicants, scoring criteria and examination information. "We made the 1990 award documentation more user friendly," said Curt W. Reimann, director of the Baldridge Award Program at the Commerce Department's National Institute of Standards and Technology. "Also we fine-tuned the key excellence indicators of major importance to manufacturing and service companies. We tried to help both potential applicants and the thousands of organizations who will use the award criteria as a tool for assessing their total quality management," he added. Copies of the guidelines can be obtained by writing Malcolm Baldridge National Quality Award, NIST, Building 101, Room A1123, Gaithersburg, MD 20899.

Topham is president, CEO of UP&L division

Verl R. Topham has been named president and chief executive officer of the Utah Power & Light division of PacifiCorp's electric operations. Topham, who was previously executive vice president of the division, succeeds the retiring Frank N. Davis. In addition, John A. Bohling has taken over Topham's position as senior vice president responsible for Utah Power's customer operations.

OPPD names chairman

The Omaha Public Power District has appointed Fred J. Ulrich chairman of the board. Ulrich joined the OPPD Board in 1986 and became vice chairman in January 1988. Other officers named to the board include: Frank J. Wear, vice chairman; Michael J. O'Hara, secretary; and John K. Green, treasurer.

Hydro plant logs 2646 days without an injury

The Kings River Conservation District Pine Flat Power Plant has reported working a total of 2646 days without a lost-time injury. According to the district, personnel at the hydroelectric generating plant have received a number of safety awards for their efforts. The Pine Flat Power Plant consists of three, 56-MW units and has 22 employees.

Utilities fined by NRC

The U.S. Nuclear Regulatory Commission recently proposed the following fines:

Consolidated Edison Co.
A $50,000 fine for an alleged violation of NRC emergency planning requirements at the Indian Point Unit 2 nuclear power plant.

GPU Nuclear Corp.
A $50,000 fine for alleged violations of NRC requirements for protection of workers from radiation at the Three Mile Island Unit 2 nuclear plant.

Iowa Electric Light & Power
A $50,000 fine for failing to fully correct previously identified electrical safety violations at the Duane Arnold Energy Center.
Also, a $25,000 fine for failing to adequately test the integrity of the building surrounding the reactor containment.

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Winter bills increased far less than consumer prices

WASHINGTON – Residential electric bills increased about 0.4 percent during winter 1988-89 over the previous year, compared to a 4.4-percent hike in the Consumer Price Index, said the National Association of Regulatory Utility Commissioners.

8.07c/kWh average for 500 kWh

The average nationwide cost for the period was 8.07 cents/kilowatthour, compared to 8.04 cents for the previous period, according to the 11th winter residential electric bill survey.

Average Northeast regional rates (10.7 cents/kilowatthour for 500 kWh) and Pacific Southwest (9.4 cents) rates were the most expensive while those of the Northwest (5.5 cents) and Rocky Mountain (7.3 cents) were least expensive.

Rates varied nearly 300 percent from high to low. Consolidated Edison Co. of New York had the highest average cost at 12.8 cents/kilowatthour. Washington Water Power Co. in Idaho had the lowest at 4.2 cents/kilowatthour.

In 12 service territories, customers paid an average of 11 cents or more per kilowatthour. In 27 areas, they paid 6 cents or less. Actual consumer costs depend on the usage level and applicable state sales tax.

The survey covers 187 territories for December, January and February for 250, 500, 750 and 1000 kWh.

Copies

A copy of the 210-page report may be obtained from NARUC, P.O. Box 684, Washington DC 20044, for $18.50.

Twelve Most Expensive Service Territories

Company	State	Avg. Cost Cents/kWh	Winter 1988-89 National Rank
Consolidated Edison Co. of N.Y.	New York	$0.128	1
Kauai Electric Co.	Hawaii	$0.126	2
Philadelphia Electric Co.	Pennsylvania	$0.123	3
Long Island Lighting Co.	New York	$0.122	4
Orange & Rockland Utilities, Inc.	New York	$0.121	5
Northern Indiana Pub. Service Co.	Indiana	$0.117	6
Hawaii Electric Light Co.	Hawaii	$0.117	7
Ohio Edison Co.	Ohio	$0.113	8
Commonwealth Edison Co.	Illinois	$0.112	9
United Illuminating Co.	Connecticut	$0.111	10
Atlantic City Electric Co.	New Jersey	$0.111	11
Nantucket Electric Co.	Massachusetts	$0.110	12

Twelve Least Expensive Service Territories

Company	State	Avg. Cost Cents/kWh	Winter 1988-89 National Rank
Washington Water Power Co.	Idaho	$0.042	187
Washington Water Power Co.	Washington	$0.043	186
Pacific Power & Light Co.	Washington	$0.043	185
Potomac Electric Power Co.	Dist. of Col.	$0.045	184
Idaho Power Co.	Idaho	$0.045	183
Idaho Power Co.	Oregon	$0.048	182
Portland General Elec. Co.	Oregon	$0.051	181
Kentucky Utilities Co.	Kentucky	$0.052	180
Minnesota Power & Light Co.	Minnesota	$0.052	179
Puget Sound Power & Light Co.	Washington	$0.053	178
Nevada Power Co.	Nevada	$0.054	177
Edison Sault Electric Co.	Michigan	$0.055	176

Northern Indiana PS eliminates 300 jobs

HAMMOND, IN – Northern Indiana Public Service Co. is eliminating 16 percent, about 300 of 1800, nonunion positions at all levels.

Retirement packages were taken by 164 employees; 130 were cut. The accompanying reorganization reduces the number of nonunion workers from 1824 to 1530.

The restructuring of the company's five business units will eliminate several levels of management, and consolidate or cut a number of departments that don't fit the company's future plans. Areas affected include energy distribution, corporate marketing, electric supply, gas operations and the corporate support group, which includes financial and administrative functions.

Early retirements were offered through Feb. 9; eliminations and tranfers were to be determined after that. A severance package and counseling accompany severence.

Gary L. Neale, president and chief operating officer, described the restructuring.

"We must change to become more responsive to customer needs for cost-effective, environmentally sound energy service and adapt to a more competitive energy environment in the '90s," he said.

Nevada sues over Yucca site; DOE says suit is without merit

WASHINGTON – The Deparfment of Energy called Nevada's lawsuit against DOE's Yucca Mountain site characterization without legal merit.

The lawsuit, filed in Ninth U.S. Court of Appeals in San Fransisco, asks for an order to terminate site characterization for a high-level waste respository at Yucca Mountain.

In a statement the DOE said it has been "conscientiously attempting to carry out a law enacted by Congress in 1987 that requires DOE to characterize the Yucca Mountain site .... The State's actions have frustrated DOE from carrying out the will of Congress."

Previously the state announced it would return unapproved permit applications filed with the State by DOE in early 1988. DOE is caught in the middle – federal law requires site characterization, but also that it obtain permits from Nevada to do the work.

Secretary Watkins said DOE would not seek legislative relief if the lawsuit with Nevada bogs down, but stay in the courts, according to an account in the *EEI Washington Letter*.

Last uranium closes in New Mexico

In news on the other end of the nuclear fuel cycle, the last uranium mine in New Mexico ceased production in January due to low prices.

Competition in the spot market by Canada, China and the U.S.S.R. has cut spot market prices as low as $10 per pound, less than a quarter of the 1978 price. About 55 mines were operating in the state then.

Comanche peak unit reaches low power

DALLAS – Texas Utilities Co. received a low-power license for one unit of the Comanche Peak nuclear plant, loaded fuel and expected to start low-power testing before the end of February.

Questions resolved

The Nuclear Regulatory Commission said questions about design and construction issues that led to suspension of the licensing process in January 1985 were resolved. The second unit is about 85-percent complete and is expected to be finished in 1992.

Milestone

"This is the most important milestone to date for Comanche Peak," said Erle Nye, TU Electric chairman. "It is the first step toward commercial operation of a plant that will provide needed generating capacity and fuel diversity, as well as continued service reliability for our customers."

The price of the two-unit plant is $9.1 billion. Previously, TU settled issues with an activist group and purchased three other owners' shares' settling litigation. Construction began in 1973.

Seabrook license is expected soon

SEABROOK, NH – Seabrook operators expect the Nuclear Regulatory Commission to grant a full power license by the end of February.

On Jan. 18, the NRC staff recommended licensing (*EL&P*, Feb., p.3).

After a two to three month power ascention program, full-power operation on the 1150-MW reactor would be expected in late spring or early summer.

Consumers Power starts buying power under new contract

JACKSON, MI – Consumers Power Co. began buying electricity from a Michigan hydroelectric generating plant as the first purchase under the terms of a contract filed with the Michigan Public Service Commission (MPSC).

The 230-kW Morley Hydroelectric Generating Plant on the Little Muskegon River in the Village of Morley is selling its entire output to Consumers under a long-term contract signed January 1987.

Consumers also is purchasing electricity from 18 other cogenerators and small power producers under previous contracts.

Helping meet demand

Said Gordon L. Heins, Consumers senior vice president of energy supply, "The Morley hydo dam, and other independent and small power projects under development in Michigan, will provide much-needed electricity to help meet the increasing demand for power in Michigan."

Commission actions

MPSC reaffirmed key findings of its cogeneration policy for Consumers' service territory in January but required the company to take action consistent with the findings in its application for approval of its 1990 plan and in its factors for recovering its power supply costs. The commission's Sept. 26, 1989, order reaffirmed the prior findings of an avoided capacity rate of 3.77 cents and the amount of capacity authorized (1160 MW) in its Case No. U-8871, et al.

MPSC also did not limit capacity supplied by any one project, which meant that Consumers could buy more capacity from the Midland Cogeneration Venture Limited Partnership (MCV) than the previous 638-MW limit.

In order to provide ratepayer protection, however, the comission also ordered that capacity payments for projects using natural gas or oil be backloaded by 40 percent, commencing in 1990 at 2.26¢/kWh.

What Consumers wants

In late January, Consumers filed a motion for relief to implement the MPSC Dec. 21 order concerning cogeneration and small power projects in the company's service territory.

The filing dealt with the potential impact on customers and shareholders of a national financial accounting standard (SFAS 92) in the commission's order.

Plans to implement

With resolution of the accounting issue, Consumers plans to implement the order, which, it says, would result in a one-time, after-tax write-off of $240 million from the reevaluation of the utility's notes from $1.55 billion to approximately $1.22 billion. These notes relate to assets transferred from Consumers to MCV.

In addition, on Jan. 31, the Federal Energy Regulatory Commission planned to consider MCV's application for recertification of its cogeneration project.

EPA may gain status

WASHINGTON – President Bush said he would not oppose legislation that elevates the Environmental Protection Agency to cabinet-level status.

Two such bills now in Congress include provisions to make a bureau of environmental statistics and create a federal commission to conduct a two-year study of how environmental issues should best be handled by the federal government, according to the Jan. 29 *NEMA Washington Report*.

The reference numbers are H.R.3847 and S.2006.

COMMENTARY

Single industry proposal offers economic air cleanup

Congress should stop, look, and listen! It's about to railroad the people who know air quality improvement best. Congress is under the misconception that it knows more about the solution to the problem than you do!

In a cooperative move, the Edison Electric Institute, American Public Power Association and National Rural Electric Cooperative Association have endorsed an alternate clean-air proposal based on free-market principles, flexibility and lower costs than the administration's bill (see p. 1).

If Congress is short-minded enough to insist on clean-air legislation prior to release of the results of the $600-million National Acid Precipitation Assessment Program next September, it would do well to recraft current legislation to fit this joint proposal. After all, these groups represent the people who are obliged—legally mandated—to responsibly provide safe, reliable service to electricity customers. And, by and large, they are the people who have been cleaning stack effluents already. They know the problems, the technologies to solve them and the many trade-offs involved.

In the past, when Congress has acted as if it knows more about technical subjects than those dealing with it on a day-to-day basis, and has acted without their concurrence and agreement, the new laws have becomes a prescription for disaster for the American consumer.

If Congress really believes it must prescribe specific cures for our various environmental problems, it should at least wait, like any responsible doctor, until all test results are in and the true nature, severity and causes of the malady are scientifically defined before prescribing the cure....

We urge you to write your senators and representatives...and to do it NOW. Tell Congress it's time to stop acting as if it is all-seeing and all-knowing. Tell them to listen to the people who know pollution control and air quality management best...YOU.

'We'...little word, big meaning

Investor-owned electric utilities, municipal electric departments and rural electric co-ops today are more allied than at any time in my recollections...and I've been around this industry for more than 35 years. This unexpected mark of maturity bodes well for all.

For years, considerable oratory—to say nothing of time and money—was devoted to arguing against "the other guys." Giant investor-owned utilities were pictured as just waiting to pounce on tiny co-ops and devour them in an insatiable lust for growth. Cheap loans to rural electric organizations were declared to be undermining the very essence of business in America, to say nothing of burdening the federal budget. Public power leaders screamed "takeover," and how the "yardstick" of publicly funded electric utilities showed how I-O-Us were "stealing" money from their customers.

The environment has changed. At the recent annual convention of the National Rural Electric Cooperative Association, more than 12,700 delegates were told about the challenges, opportunities and problems confronting the electric industry...and in terms of *we* and *they*. *We* meant all of us in electric power...co-op directors and managers, public power organizations and investor-owned electric companies. *They* were politicians, pressure groups and special interests.

There was focus on the real issues that will decide how successfully the electric industry will meet the demands of future customers...no hollow boasting of pureness of spirit or rightness of cause...no wasted time and energy in political posturing...just straight-forward descriptions of the magnitude of the job to be done, and how it can be accomplished. NRECA executive vice president and general manager Bob Bergland and his staff are to be congratulated for the quality of the program.

Co-ops, municipal utilities and power companies still disagree about elements of their philosophies. But they're the kinds of disagreements everyone, like family, can live with and work toward resolution.

***We* is a very small word. But its implications for the power industry are enormous.**

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Study indicates merger feasible

DENVER—The proposed merger between Colorado-Ute Electric Association and Tri-State G&T Association "is technically, economically and financially viable," and should be pursued, according to a report by Stone & Webster Management Consultants.

Colorado-Ute Chairman Joe deGanahl II and Tri-State President Hub Thompson expressed to the 38 member systems of the proposed combined organization, "The study solidly sets forth several very positive findings, particularly that a merger between the two cooperatives would result in a substantial cumulative present-worth savings of nearly $300 million in 15 years.

The study results were presented to the merger committee Feb. 1 at Tri-State's Denver headquarters. According to the study, "The proposed merger generates savings each year through the study period (1990-2004) and the present worth of these savings through the 15-year period is $293 million.

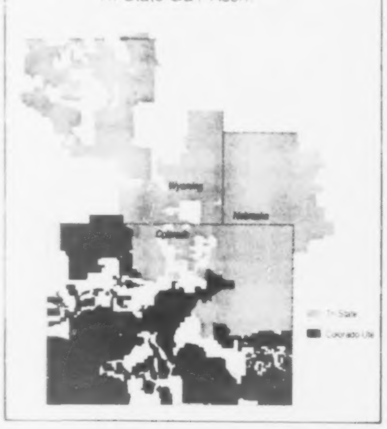
Reducing the peak load for the combined systems provides the source of greatest potential for merger synergy, according to Stone & Webster. Colorado-Ute is a winter peaking system while Tri-State is a summer peaking system.

In a combined operational mode, the 1990 annual system peak would be reduced by 203 MW which could then be made available for additional off-system sales. Stone & Webster modeled off-system sales prospects into its analysis. Several firm surplus sales contracts are currently in place, while the potential for others also exists.

Under a merger scenario, "Additional revenues are envisioned that are associated with capacity payments for a seasonal unit commitment sale that will be possible due to the combined resources. These revenues range from $1 million to $64 million per year for the 15-year study period.

The study suggests a split rate initially and gradually developing a single rate of about 4.2¢/kWh by 2001. Currently, Tri-State's average wholesale rate to its member systems is about 4.0¢/kWh while Colorado-Ute's is 4.48¢/kWh. Thompson and deGanahl said, "These benefits reflect combining the organizations and all of their member systems as they exist today. Members of the merger committee and our staffs are actively pursuing these possibilities."

Proposed merged member service areas of Colorado-Ute Electric Assn. and Tri-State G&T Assn.



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from page 1

Fiscal year '91 budget...

cost-competitive renewable energy can contribute both to a better environment and reduced U.S. oil imports." More sustained progress is needed in these areas with federal leadership, especially in deployment of advanced lighting technology.

Among renewable sources, "we need to reestablish United States leadership in photovoltaics technology by developing cooperative efforts with the domestic industry."

Of the budget, $3.8 billion goes toward the broad category of "Respecting the Environment," up from $2.7 billion in FY90. The increase is primarily due to the Environmental Restoration and Waste Management Five-Year Plan, to cover previous DOE environmental neglect at various facilities.

The funding request for "Fortifying Foundations," or science and technology, increased to $2.3 billion from $2.1 billion, including $318 million for the Super Collider.

DOE national defense portion, including the Strategic Petroleum Reserve, increases from $8.5 billion to $9.2 billion.

More strategy and the budget

NES findings will be integrated into the department's budget in FY91, more closely aligned in FY92 and fully integrated in FY93. An interim NES will be issued in April and a final version given to the president in December. The strategy will be updated annually.

According to the *EEI Washington Letter* summary, the FY91 budget proposal includes the following.

DOE numbers

Inside the DOE budget:

- Energy supply R&D also funds geothermal—$18 million, hydro—$1 million, up $1 million; electric energy systems —$27.4 million, up $9.5 million, electric storage systems—$12.9 million, up $900,000.
- Clean coal technology has $1.356 billion available as follows: FY91—$256 million, FY92—$400 million, FY93—$475 million, FY94—$225 million.
- Nuclear waste fund dropped $2.7 million to $292.8 million.
- Fossil R&D cuts more than half to $202.3 million from $243 million. It deletes the magnetohydrodynamic (MHD) generator (an advanced device for producing electric power using hot, partially ionized gases), cutting $40.4 million. Fuel cells dropped $31.9 million to $7.1 million.
- Power marketing agencies (PMA) include SEPA, $9.285 million (in half), with legislation to be proposed to sell the Administration's exclusive power marketing rights to existing customers; SWPA—$20.1 million, down $5 million; and WAPA—$298.5 million, up $4 million.

Legislation is also planned to revise PMA power repayment rules. In FY91, this would bring in an added $87.2 million from SEPA, $63.7 million from SWPA, $144.1 million from WAPA; and $590.4 million from BPA.

Environmental Protection Agency funds total $5.6 billion.

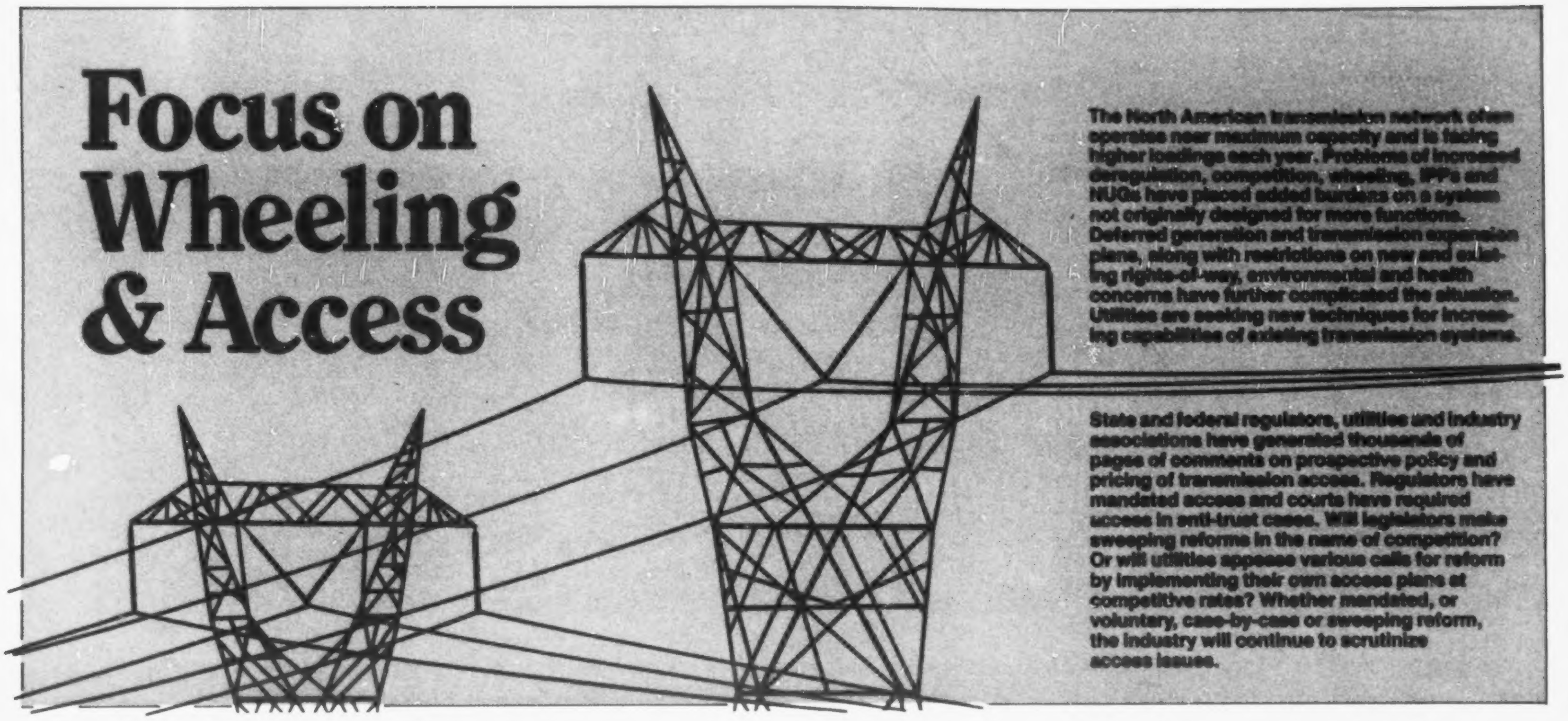
Nuclear Regulatory Commission asked for an increase of $23 million to $475 million. That includes recovery of 33 percent of NRC expenses through user fees, a drop from the 45 percent of this year. The Senate has denied the Administration's request for NRC user fees of 100 percent, but a push is expected in this direction.

The Federal Energy Regulatory Commission seeks a $7.8 million increase to $122.7 million, all to come from regulatory fees.

Rural Electrification Administration total electric loan programs would decrease by $1.59 billion.

The Department of Health and Human Services includes $1.05 billion for the Low-Income Home Energy Assistance Program, down $343 million.

Focus on Wheeling & Access



The North American transmission network often operates near maximum capacity and is facing higher loadings each year. Problems of increased deregulation, competition, wheeling, IPPs and NUGs have placed added burdens on a system not originally designed for more functions. Deferred generation and transmission expansion plans, along with restrictions on new and existing rights-of-way, environmental and health concerns have further complicated the situation. Utilities are seeking new techniques for increasing capabilities of existing transmission systems.

State and federal regulators, utilities and industry associations have generated thousands of pages of comments on prospective policy and pricing of transmission access. Regulators have mandated access and courts have required access in anti-trust cases. Will legislators make sweeping reforms in the name of competition? Or will utilities appease various calls for reform by implementing their own access plans at competitive rates? Whether mandated, or voluntary, case-by-case or sweeping reform, the industry will continue to scrutinize access issues.

Transmission systems do have technical limits

Wayne Beaty
Senior Editor—T&D

The electric transmission system in the U.S. has evolved into one of the most complex "machines" ever devised by man. Starting over a century ago as small neighborhood radial distribution circuits supplying power and lights to homes and factories, they have grown into a tremendously complex, interconnected network linking generation facilities with customers throughout the U.S. and with interconnections to Canada.

Interconnections among utilities first began in the early 1920s to improve the reliability of their systems. There were over 4000 utilities by then and some sales and power exchanges reached across state lines. Uncle Sam stepped in and ruled that state commissions could not regulate interstate sales. The establishment of the Federal Power Commission (predecessor to the Federal Energy Regulatory Commission (FERC)) was—among other things—to "promote and encourage... interconnection and coordination" among utilities selling interstate power.

Advances in transmission and control technology led to further physical integration of transmission systems.

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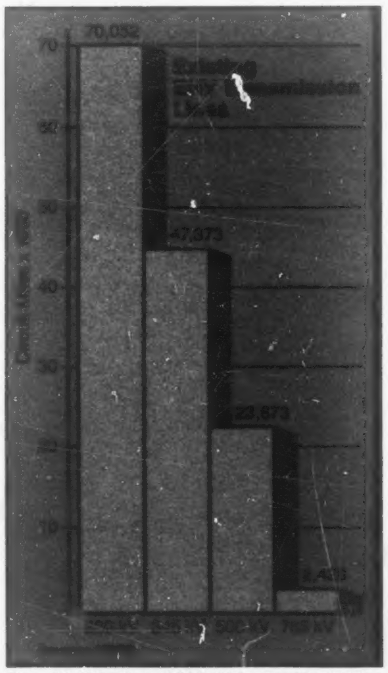
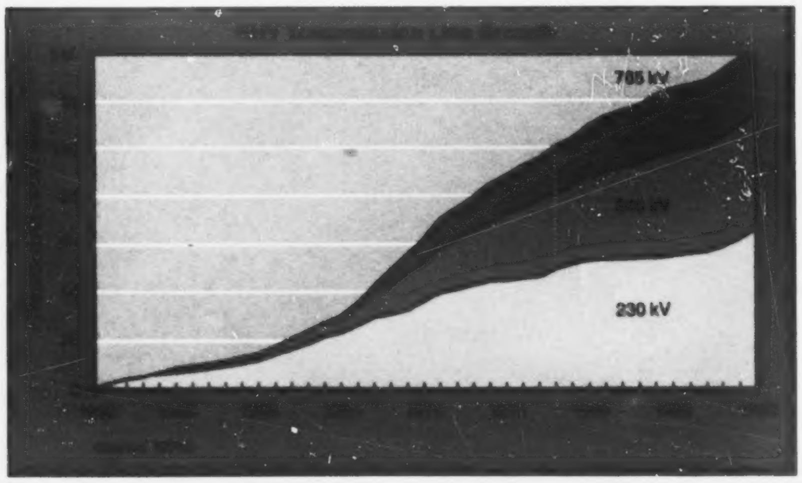


Over 70,000 miles of 230-kV lines existed at the end of 1989 but since power capacity quadruples as the voltage doubles, interest in upgrading to higher voltage systems is growing.



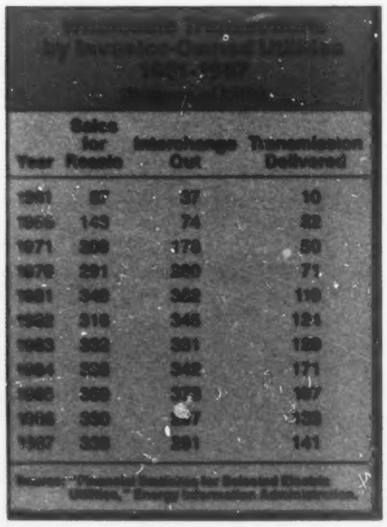
Extra-high-voltage (EHV) transmission line construction accelerated after the '65 Northeast blackout

Politics, pricing, policies, complicate access issues

Mark T. Hoske
News Editor

Industry views on transmission policies are fractured down untraditional lines because of the myriad regional, economic and competitive differences of the players. The nation's utilities again appear poised to enter a building cycle in the mid- and late 1990s that will challenge transmission planners and policy makers to incorporate increased reliance on non-utility power, and allow power purchases and wheeling from utilities that risk building baseload plants.

With increased emphasis on world markets and energy use, increased access and wheeling could allow customers, and utilities, a chance to shop for the best deal. But talk of customers "shopping around" has many utilities agonizing over long-term planning, reliability and their obligation to serve.



[illegible] by Investor-Owned Utilities 1961-1987 [illegible]

Year	Sales for Resale	Interchange Out	Transmission Delivered
1961	87	37	10
1966	143	74	22
1971	208	178	50
1976	291	260	71
1981	348	332	110
1982	316	345	121
1983	332	331	128
1984	338	342	171
1985	359	373	187
1986	330	[illegible]	139
1987	338	291	141

Source: "Financial Statistics for Selected Electric Utilities," Energy Information Administration.

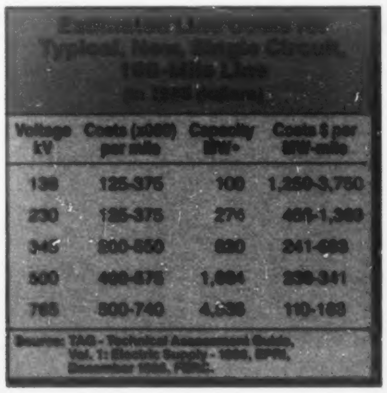
"Deliveries" fell more than "sales" after 1985, perhaps showing less grid availability

Thousands of pages of testimony, press releases, hundreds of conference sessions and debates, innovative contracts, court cases, and trend-setting regulatory decisions have shaped transmission policy so far. Some of the major views are summarized below.

Transmission Task Force report

The Federal Energy Regulatory Commission, which governs pricing issues for interstate transmission, is coming up to speed again after a recent turnover of commissioners.

Prior to the turnover, then-commissioner Charles Stalon led the FERC transmission task force that submitted a 355-page report last October. The report was called a comprehensive effort to gather and digest information. It was made to stimulate discussion on the topic, but it stops short of a direct transmission access recommendation to the commission.



[illegible] Typical, New, Single Circuit, 100-Mile Line (in [illegible] dollars)

Voltage kV	Costs ($000) per mile	Capacity MW*	Costs $ per MW-mile
138	125-375	100	1,250-3,750
230	125-375	276	461-1,360
345	200-550	830	241-663
500	400-575	1,684	238-341
765	500-740	4,536	110-163

Source: TAG - Technical Assessment Guide, Vol. 1: Electric Supply - 1986, EPRI, December 1986, FERC.

Without recovering line-expansion costs, utilities could incur significant expense

It does say, however, that current policies are unlikely to allow efficient investments in generation assets and probably not in transmission assets. "One particular option, the emergence of a competitive generation sector, may be frustrated by the lack of coherent transmission pricing and access policy," the report concludes.

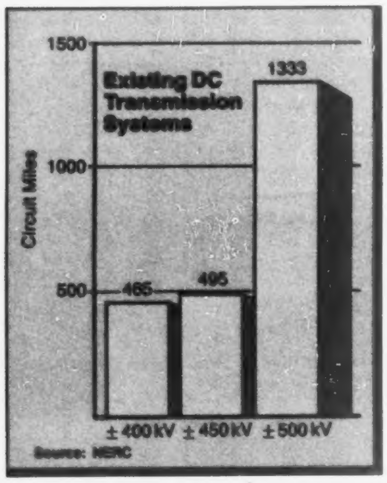
Independent power producers will not endure a financial risk of building new plant if transmission access is not assured. "Without transmission reform, the potential efficiencies of a competitive generation sector will not be

Continued on page 14

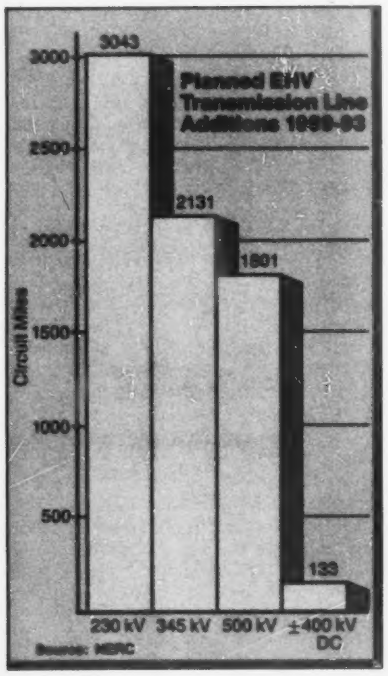
The development of high-speed, large memory computers in the last four decades has contributed enormously to the interconnection of utility systems.

Blackout changes things

The increasing interconnection of transmission systems is immediately evident in the growth of extra high voltage (EHV) systems rated at 230 kV and above which really took off following the 1965 Northeast blackout (see Fig. 1).



HVDC lines will play an important role in power transfer as well as system stability in the future.



Planned additions to transmission systems are subject to delays because of siting and other environmental problems.

A few EHV lines were built in the 1940s and 1950s, but the network expanded rapidly beginning in the 1960s (see Figs. 2-4). Although it is claimed by some that transmission networks were designed for reliability alone, surveys made in 1964 and 1970 by the Federal Power Commission (FPC) revealed that efficient use of resources and cost reduction also were important factors considered by the designers of EHV networks.

After an extensive study of the circumstances of the 1965 blackout, the FPC formed an industry-wide committee to develop general guidelines and criteria for transmission system design and operation.

This effort evolved into regional reliability councils and the North American Electric Reliability Council (NERC). The principal purpose for these nine regional councils and NERC is to create, promulgate and enforce operating standards for the grids.

Focus
On Wheeling and Access

North America's interconnected systems create four physically separate, synchronously operated transmission networks (see Fig. 5): the Eastern Interconnection, includes seven of the nine regions; the Texas Interconnection; the Western Systems Coordinating Council; and the Hydro Quebec System.

The dc and ac interties between these interconnections are limited in location and capacity. The barriers between them limit the market areas for power exchange. For example, there is little opportunity to transfer power from relatively low-cost power areas to higher cost power areas.

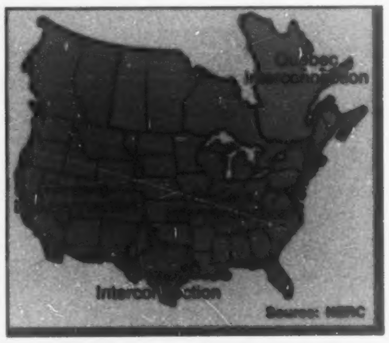
Although it would be possible to construct ac-dc-ac interties to permit greater power flow between regions, there are sound technical reasons for maintaining separate networks.

Focus on transmission

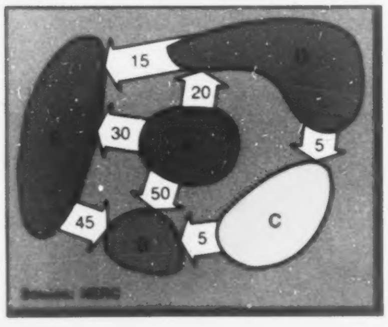
Transmission systems have become a focus today because of several factors including:

- Production cost differentials among utilities and regions that make capacity and energy exchange desirable.
- Difficulty in justifying building new generating units, especially when it might be cheaper to purchase power from others.
- Emergence of non-utility generators (NUGs) and independent power producers (IPPs) promulgated by the Public Utility Regulatory Policies Act of 1979 (PURPA).
- Regulatory changes by the FERC which may encourage more competition among utilities and other electricity suppliers.

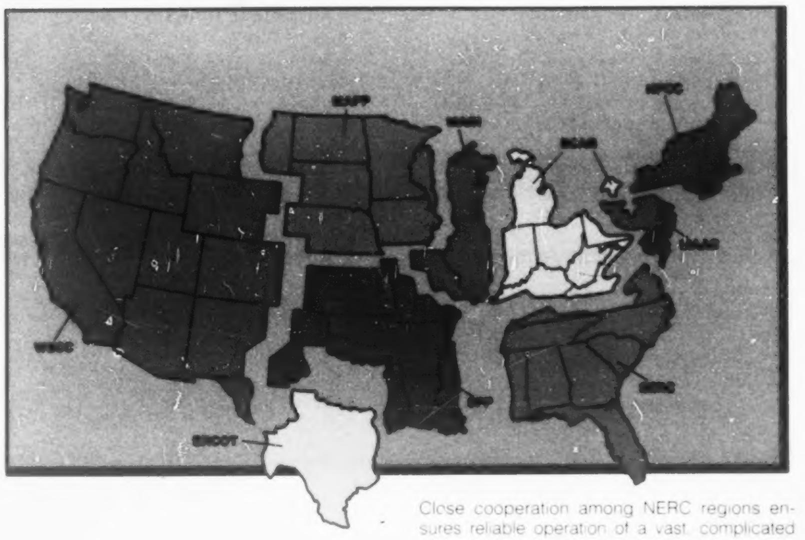
Since electricity has become such an integral part of our lives, many take its availability for granted. But the complex network of generation, transmission lines, substations and other facilities that make this power available to us was carefully designed by engineers to perform definite tasks within prescribed limitations.



Four major interconnected regions comprise the North Amercican Electric Reliability Council (NERC) to facilitate energy exchanges and maintain system stability.



Energy interchanges among regions may take multiple paths by following laws of physics—not contractual agreements.



Close cooperation among NERC regions ensures reliable operation of a vast, complicated network of generation and transmission systems. Plans are underway to make it even more reliable and able to withstand abnormal conditions.

Today, that system is being called upon to operate under challenging conditions not originally conceived because of the changing business environment. Increased fuel prices, capital costs, environmental constraints and regulatory restrictions have all placed a heavy burden on the system and its designers.

Transmission systems are designed and built to reliably deliver electricity to distribution systems. Reliability is enhanced by connecting utility systems together. The connection also provides a means to exchange electricity between systems when one area might have a surplus and another area a deficit.

Electric networks are different

Electric networks are not like pipeline systems and even less like telephone networks. In every other business, the delivery of commodities can be routed and switched over selected paths to a specific delivery point. The dispatcher of electricity however, has no choice in deciding the path. In effect, every generator is connected to every customer.

The "path" is determined by Kirchoff's laws and laws of physics, not contracts between supplier and customer. When a light is turned on, or a motor is started, or a computer switched on, the electric systems must respond instantaneously and the current may flow over all available paths.

As electricity transfers increase, they may use up the transfer capability of already heavily loaded portions of the system and the capability planned for future load growth, and, in the extreme, overload critical facilities.

Control areas

Utilities schedule electricity interchanges through control areas with each of the NERC regions (see Fig 6). Not all electric utilities can schedule electricity interchanges. To do so, a utility must have generating units of sufficient size and number; be able to monitor the interchange; and be able to control a sufficient number of its generating units so its actual interchange equals its scheduled interchange. This ensures that its customers' demands are being met.

A utility or group of utilites that can schedule interchanges is called a control area and they are controlled by procedures outlined in NERC's Operating Guides.

Although most electric utility systems are interconnected only with neighboring systems, in reality, they are indirectly connected to all systems. For example, if a load of 100 MW is being transferred from Control Area A to Control Area B (Fig. 6) half of it might flow directly from A to B and half through the three other interconnected control areas.

There are 150 such control areas in North America and Canada that control nearly 100 percent of the electricity generated in each of the nine NERC regions.

Regional status

The managers and dispatchers in each of the NERC regions stress that transmission lines are built for specific purposes, and problems arise when those systems are called upon to perform functions not originally intended.

Bob Woodward, manager of the Pennsylvania-Jersey-Maryland (PJM) power pool—a part of the Mid-Atlantic Area Council (MAAC) region—says, "The primary criteria for our system is to optimize economic transfer." The MAAC transmission network operates well above 90-percent utilization and has since 1981 when this measure of system use was instituted. Woodward says there are some local problems at times, especially when the generated power comes from the eastern Hydro Quebec area.

Woodward adds, "We could use a few more lines but there is only an incremental benefit from any one new line." MAAC is still awaiting completion of the 500-kV Washington-Baltimore loop which has been tied up in court actions for years.

The impact of increased wheeling on system reliability continues to be a major concern to Southeastern Electric Reliability Council (SERC) members, although the region continues to voluntarily participate in capacity transfers among utilities located within or interconnected with SERC. These transactions involve both economy energy and capacity exchanges.

Chuck Winn, administrative manager, SERC, says the region was able to handle the recent winter ice storm that affected Florida by using rotating blackouts. The four consecutive days of subfreezing weather was unusual for Florida, and even though the region hit its 1996 projected winter peak, there was no real danger of system instability.

Winn pointed out that the SERC region is in its fifth consecutive year of increased winter peaks.

Chisna Fleming, vice chairman of NERC's Reliability Assessment Subcommittee, says, "There are a few 'bottlenecks' in the various transmission regions but through proper planning and operation, the problems are minimized." Fleming points out that planning and construction lead times for new transmission lines are still quite lengthy. For example, he cited a

Continued on page 31

Focus On Wheeling and Access

fairly tested."

The recommendations say:

- The commission needs to design or affirm policies to efficiently accommodate the industry's need for new power plants by attracting independent power producers.
- FERC should ask Congress for the authority to prevent transmission owners and/or state regulators from withholding existing transmission capacity or refusing to add needed new capacity. Or the FERC could ask owners to mitigate their market power and state regulators to relegate parochial interests as needed to accommodate a long-term firm transmission transaction over a congested transmission corridor. This still could allow decentralized planning, the report said; however, state regulators often express concern of losing power to federal regulators.

Average Wheeling Revenues for 15 Major Wheeling Utilities in 1987

	Gigawatt Hours Delivered	Total Revenue (Millions $)	Average Rate m/kWh
1. Pacific Gas & Electric	8,098	16.3	2.01
2. Maine Electric Power	5,841	3.8	0.65
3. Vermont Electric Power	5,321	16.1	3.03
4. Gulf States Utilities	5,090	18.2	3.58
5. Florida Power & Light	4,881	21.9	4.49
6. Public Service of Indiana	3,716	7.9	2.13
7. Idaho Power	3,223	3.8	1.18
8. Boston Edison	3,086	8.8	2.85
9. Utah Power & Light	3,008	7.7	2.56
10. Consolidated Edison	2,939	9.7	3.30
11. Montana Power	2,822	5.9	2.09
12. Delmarva Power & Light	2,406	0.7	0.31
13. Mississippi Power & Light	2,361	7.9	3.36
14. Portland General Electric	2,261	3.1	1.37
15. Virginia Electric & Power	2,159	8.6	3.98
Total	57,212	140.2	2.5

Source: Transmission account data from 1987 FERC Form #1.

No apparent relationship emerges between average wheeling rates and amount of power delivered by 15 major investor-owned utilities. Other factors, including regulation, available external power sources, and system demand may have more impact on wheeling transactions.

- "Regulatory frameworks are needed to create pricing discipline and allow participants to react quickly to changing market conditions."
- Flexibility in regulation over the past 15 years' excess capacity market may not be appropriate during the next 15 years of tighter capacity. Although generation is no longer a natural monopoly, transmission essentially is. Regulation "should be tailored to these new realities."
- Transmission debate today is no longer focused on utilities' concern for providing captive customers access while recouping the transmission line investment. With the debate shifted to building power plants, the industry is no longer united against transmission reform, the report stated.

The report also contains summaries of the various industry views including policy recommendations or transmission proposals from the Edison Electric Institute; American Public Power Association; Pacific Gas & Electric Co.; Transmission Access Policy Study group, a public power interest; ELCON, a group of large electricity users; Large Public Power Council, a group of 17 large public power systems; Utility Working Group, made up of 12 investor-owned utilities; and the "Group of 5," investor-owned utilities. (See the summary table on transmission positions.)

Summary of Transmission Positions

Issue	FERC	TAPS	APPA	ELCON	PG&E	MSU	EEI
Access and Price of Transmission	• No formal position • In Turlock and Modesto Commission required average system cost service sufficient to meet projected load, but permitted flexible pricing for coordination service where market power had been mitigated	• Maximum use of FERC (and state) authority to compel wheeling at non discriminatory rates	• FERC should have workable authority to order transmission service on fair and non discriminatory terms to all industry sectors	• FERC and the States should have authority to order wheeling • FERC should set rates based on cost of service	• Cost based (long run marginal) rates for transmission sufficient to mitigate market power for first contract period • Flexible pricing for coordination service when market power has been mitigated • Transmission provided point-to-point	• Flexible pricing for all non retail transactions • No linkage to bulk power supply contracts • No exclusion of subsidized entities	• Maintain current system of voluntary access • Pricing flexibility is needed for non-firm transmission service. Cost is appropriate basis for price of firm service if no facility upgrade is needed.
Cost of Upgrades	• No position • Suggestion in Utah Power and Light case that the cost of upgrades may be assigned to party requesting service, but such costs subsequently might be allocated to other beneficiaries of additional capacity	• Customer option to invest in new facilities • FERC and States should promote joint planning	• Upgrades and additions planned on regional basis with price and access provided on just and reasonable terms	• Intrastate defined by contract path • Commissions should order additions and upgrades • Net costs attributable to applicant are borne by that applicant	• Incremental cost of upgrades should be borne by party requesting upgrades • No ownership rights	• Same as PG&E except not limited to only meet reliability needs	• Cost of upgrading transmission should be case specific, but not assigned solely to the owners.
Obligation to Serve	• Commission will not permit termination of service to captive customers • Customers who have voluntarily arranged to leave host utility, assume risk of "best efforts" service • Rate for "best efforts" service need not be based on embedded cost or the charge for service in a market where seller lacks market power	• Customer should have option of continuing requirements service, using wheeling to transfer req. service to a new supplier, or use wheeling to obtain new sources of supply under own planning regime • If customer leaves, then no automatic right to return	• Same as TAPS	• Customers who cease firm service then desire to re-establish firm service should be viewed as new customers	• No extra-contractural obligation to serve • Additional service provided at expiration of contract is placed at the margin	• Same as PG&E	• No obligation to provide longer term, firm service • Utility customers should not subsidize transmission services for third parties.
Competition	• More recent decisions indicate the Commission believes control of transmission confers market power	• Open access at embedded cost rates could allow relaxation of regulation of power and energy sales in areas of vigorous competition	• Same as TAPS	• Must have guaranteed access to multiple markets • Utility and non utility generators should competitively bid	• Proposed Sufficiency Conditions must be met to demonstrate market power of wheeling utility has been mitigated	• Same as PG&E except with development of service plan by host utility and purchaser States or FERC arbitrate	• Recent competitive procurement of power supplies has demonstrated significant interest and competition within the existing regulatory framework.

Source: APPA, EEI, FERC.

New FERC chairman's position

Martin L. Allday, new commissioner replacing Martha Hesse as FERC chairman, recently said he supports open access transmission measures that discourage owners of transmission facilities from using ownership to exercise market control over generation.

Further, he suggested that future FERC decisions should carefully define legal rationale.

EEI opposes wheeling cash

In various statements, including a series of monographs on transmission issues, the Edison Electric Institute has stated that open access—unrestricted customer wheeling—would break down the obligation to serve, utilities' ability to supply power, and lead to an overall breakdown in the industry and the nation's economy.

EEI maintains that the nature of the system can't allow true competition—generating resources are too expensive for owners to risk building them if the market for their power is not available. Any gains from open access would be from short-term profit-takers, the group noted. (Another EEI resource on the topic is "Transmission Access and Wheeling: a Summary of State Laws and Regulation.")

Standing industry rulings/policy

Merger activity has prompted a look at transmission access arrangements and market power. The FERC approval for the PacifiCorp/Utah Power & Light merger was conditioned on an access agreement.

FERC staff and various other parties have suggested that the approval of the proposed Southern California Edison Co./San Diego Gas & Electric Co. merger also might be conditioned on transmission access for other utilities. Staff argued that the merged utility could exercise significant market power over California cities served by SCE without mandated firm service.

In addition, several parties involved in the Northeast Utilities Co. buyout of Public Service Co. of New Hampshire indicated that transaction may include an access arrangement.

Transmission as a profit center

With utilities closely watching costs and seeking new ways to generate additional revenue, some—like Ashley Brown, chairman of the Ohio Public Utilities Commission—suggest using transmission as a profit center.

A recent example of a utility wheeling proposal is Public Service Co. of Indiana's FERC request for market-based pricing for a capacity sale in trade for offering transmission access.

PSI wants to offer long-term firm transmission service to all utilities, qualifying facilities and independent power producers and sell up to 450 MW of long-term power at market-based rates.

PSI: market pricing, open access

The transmission service would be priced at embedded cost—$1.05/kW/month—if no system modifications are necessary.

Nonfirm transmission pricing is more complex: PSI's applicable losses, plus 1 mill/kWh for difficult-to-quantify costs, plus up to one-third of total net savings resulting from the transaction, calculated as the difference between the seller's incremental costs and the buyer's decremental costs.

Utilities requesting transmission service must agree to provide similar service to PSI. The rates for the power sale would be at, or below, the purchasing utility's avoided cost for alternative service. Purchasers would be only those utilities not now PSI captive customers.

The proposal also includes the following conditions:

- The purchaser must be an eligible customer, except for full-requirements customers.
- The sale must be at least for five years and negotiated at arm's length.
- The purchaser must certify that the negotiated price does not exceed the purchaser's alternative cost of power.

If needed, PSI agreed to construct additional transmission facilities to be paid for by the purchaser.

In response to this, the commission said its objective is to increase competition and find a proposed market-oriented rate that's just and reasonable under Federal Power Act standards.

This rate should fall within a "zone of reasonableness," bounded at one end by the investor interest against confiscation and at the other end by the consumer interest against excessive rates. FERC said it anticipates that certain conditions would be attached to the rate, expected to take effect May 24.

Various utilities, interest groups and regulators have intervened. The FERC docket number is ER89-672-000.

Siting and expansion

Although the transmission system

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Focus on Wheeling and Access...

has been steadily growing, planners haven't had as much difficulty in siting new lines as debate may suggest, according to the FERC task force report. The report pointed out that the total of NERC Reliability Assessment troubled lines totaled about 100 circuit miles of transmission, compared to several thousand miles added every year. While that doesn't lessen the concern for project delays, the problems seem small compared to overall success.

In addition, many more siting requests are approved than denied, according to a 1986 National Governors' Association Task Force survey of state regulators.

Transmission service pricing has varied components. FERC now uses an average embedded-cost method for firm transmission service. But some suggest the incremental cost of building should be used as basis for firm service in some cases.

Health effects

Another component of transmission politics and policy is EMF, or electric and magnetic fields, which could restrict growth and siting of future transmission lines and increase access and wheeling prices.

Not-in-my-backyard (NIMBY) opposition has long challenged project siting through densely populated areas. Recent studies on EMF have given opponents more fuel for their disputes.

Previously only a side component in transmission policy, EMF is getting increased attention with a challenge to a Florida law limiting transmission capacity. Also, recent widely reported studies linking telephone workers' EMF exposure with cancer has increased electric utilities' attention on the matter.

William A. Badger, chairman of the Electricity Committee of the National Association of Regulatory Utility Commissioners, pointed out to health leaders in January that "because the evidence is still inconclusive, we believe the matter requires further study."

Badger said despite extensive studies by the Electric Power Research Institute and others, an expanded federal research effort is needed. His comments were in a letter to the National Cancer Institute, the National Institute of Environmental Health Sciences, the National Institutes of Occupational Safety and Health, and the Environmental Protection Agency.

Antitrust cases

Antitrust cases have directed transmission policy as well. Even with sweeping federal or state policies, these cases would continue to provide the industry guidance. In addition, greater competition may lead to changes that limit utilities' coordinating transmission and generation facilities.

PURPA, PUHCA, other policy tie-ins

Power pools, wheeling agreements and FERC filings for bulk power purchases have abounded for years. But during discussion about changing the industry's competitive nature, municipal utilities, cooperatives, wholesale utility customers and investor-owned utilities seek to better market position to best serve customers.

When industry reform is mentioned, transmission access is not far behind. Policymakers could encourage competition and remove disincentives in the bulk power market by modifying the Federal Power Act and the Public Utility Holding Company Act of 1935 (PUHCA).

APPA and NRECA have expressed concern that recent legislation to revise PUHCA could create new classes of competition that would squeeze co-ops and municipals out of the picture. Proponents insist, however, that all interests would be protected and the market best served with such revisions.

PS New Mexico seeks ownership clarification

ALBUQUERQUE, NM—Public Service Co. of New Mexico petitioned a U.S. district court to confirm its ownership of the lines and poles the company built on public rights-of-way belonging to the City of Albuquerque. At the time of the request, the city council was considering property takeover without consent.

The utility defended its service.

"We repeatedly are charged with having the highest rates in the region," said Bill Eglinton, chief operating officer. "In fact, 18 electricity suppliers inside New Mexico have higher rates than we do. And, I can assure you that a City owned and operated utility will have higher rates, too."

Wisconsin Electric trims rates again

MILWAUKEE—Wisconsin Electric Power Co. lowered retail electric rates 2.9 percent, $29.7 million, the ninth decrease since 1983.

"This decrease," said WE Senior Vice President Dave Porter, "reflects the results of energy-efficiency improvements by our customers and continued cost-reduction efforts by our employees."

The Wisconsin Public Service Commission approved the Jan. 12 decrease, and a 1.2-percent steam rate increase for 500 downtown customers.

NUS forms nuclear information service

CLEARWATER, FL—NUS Corp. formed the Nuclear Issues Information Service (NIIS) to provide present and emerging regulatory news to clients.

NIIS is based on two 10-year-old NUS services, Nuclear Safety Issues Review and Nuclear Ratemaking Review.

For more information contact NUS Corp.'s Pete Jordan at (813) 796-2264.

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Bypass for absorber plant no.1
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Bypass for absorber plant no.2
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Bypass for absorber plant no.3
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Inquire R.S. 5

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Focus on Wheeling and Access...

planned 12-mile 138-kV line which, if started today, would take until mid-1994 for completion.

Fleming adds, "Usually the immediate problems brought on by system limitations can be overcome by using phase shifters and capacitors, but these are short-term solutions. Sooner or later additional generation and transmission lines will have to be built."

Technical problems

Transmission systems have technical limits since they were designed for specific purposes and have only limited capability to take on additional duties. An Electric Power Research Report (EL-6549) points out four traditional functions for all transmission systems and the emergence of two additional ones.

First, about 85 to 90 percent of all transmission lines are built to deliver power from generators to load centers—the most basic of purposes.

Second, about 10 to 15 percent of lines are built to facilitate reserve sharing. Since the organization of power pools—begun in the 1920s and accelerated in the 1960s—utilities have interconnected transmission systems to reduce investment in power plant capacity. The introduction of EHV and UHV voltages of 345 kV, 500 kV, and 765 kV helped greatly in this effort.

Third, economic interchange of power among utilities within a power pool can reduce overall costs. Such sales of power over lines already in place are usually adjusted on an hourly basis because of the changes in the mix of loads within each utility system throughout the day.

Fourth, about 2 to 5 percent of transmission lines are added to a network to increase the reliability of the electric power supply for a region. NERC considers reliability to be of primary importance in planning transmission systems.

Each day, it is common for some of the thousands of operating generators and transmission lines to be taken out of service. Seldom, however, do the lights go out. It's the transmission system, with network configurations, operating reserve, and the ability of the system operator to control and coordinate generation dispatch during system emergencies, that keep customer's electric service reliable.

In addition to these four well-established functions for transmission systems, two other functions are emerging.

The first of these is wheeling of power, as distinguished from the direct interchange of power for economic purposes between two utilities. Wheeling means that a utility allows its transmission lines to be used to transfer power between two other parties and the utility owning the transmission line may not be directly involved in the transaction.

The second is third-party access in which non-utility generators, cogenerators, and small independent power producers negotiate with the transmission line owner to transmit power from producer to user.

Transmission operation

Utilities constantly monitor their transmission systems to assure that line loadings are kept within proper limits. There must be sufficient capacity in the system to allow for probable outages.

In addition to weather-related outages, thermal limits of the lines must be considered in order to stay within design limits and prevent problems. Limits on current flow are set to prevent overheating and sagging. Improvements in relaying and monitoring equipment have helped keep this potential problem at bay.

Protective equipment can isolate a fault or short circuit within a few cycles to prevent excessive damage. When a line or section of line must be isolated, the remaining parts of the system must be able to carry the added load.

If parts of a transmission system are thermally constrained, some remedial measures might be to replace the conductor with larger ones with higher thermal capacity. A temporary measure might be to revise the relaying scheme to trip the circuit prior to excessive overheating.

Another solution might be to add another conductor to an existing one in a bundle. In some cases, this might mean that towers and crossarms need to be strengthened to account for the extra weight.

Voltage limits

A power system is designed to operate at a nominal voltage within a certain bandwidth—usually 5 to 10 percent above and below the nominal voltage. The most effective way to obtain more power transfer capacity over a given line is to increase the voltage.

Since power transfer capability increases as the square of the voltage, doubling the voltage results in a quadrupling of capacity. Many transmission lines built prior to the 1960s, had very conservative designs and in many cases, midspan clearances are such that they could operate at higher voltage and still maintain code clearances.

Whether or not a particular line could economically be upgraded and the voltage raised depended upon whether changes to the substations—changing transformers, circuit breakers, and other similar equipment—could be made economically.

Stability considerations

In an alternating current (ac) network, all generators rotate in unison, or synchronism, at a frequency of 60 Hz. The ability to maintain a constant frequency is a measure of the stability of the system.

Normally, a system disturbance will cause small changes in the power output, which tends to bring that generator back to the common speed of the

Continued on page 33

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Inquire R.S. 16

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Focus on Wheeling and Access

system. Stability limitations may appear in a variety of forms throughout the system. The transmission system plays a part in maintaining system stability. Various control schemes and monitoring equipment are used.

One method by which reliability and safety may be preserved is to generate power at particular locations without regard to economic dispatch. A second way may be to change the transmission network itself by disconnecting one end of a constraining line—usually limited by low voltage. The line then carries only the loads directly connected to it. The tradeoff is lower reliability since the load now has only one path from the generator.

Phase shifting is another method to control power flow. Power flow can be altered by changing the phase angle between the input and output voltages by using a phase shifting transformer or regulator. These devices act as a valve to increase or decrease power flow.

These have not been widely used because of reliability problems.

A technique called rapid adjustment of network impedance (RANI) can be used to continuously vary VAR compensation to maximize the power flow on a particular line. The Bonneville Power Administration is experimenting with RANI, and in a preliminary study the system compared favorably with switched shunt capacitors, static VAR compensators (SVC), and switched series capacitors on the Pacific Intertie in providing transient stability.

Role of dc

High-voltage direct current (HVDC) lines are used between the four interconnected BPA regions to provide asynchronous connections. Power transfer can be directly controlled through dc lines and may enhance stability as well.

According to a study made for Congress by the Office of Technology Assessment, HVDC appears to be the single most powerful method of direct flow control in the battery of options. If this method proves to be economically feasible, it could have a major impact on the industy.

The increased use of HVDC has been made possible by developments in high-power semiconductors to allow electronic rather than mechanical controls in converting ac power to HVDC and back to ac again. Individual power semiconductors or thyristors have been developed that can carry up to 3,000 amperes at 6 kV. When combined in series and parallel, power carrying capabilities of thousands of megawatts at up to 500 kV are now being achieved.

The thyristors used in this arrangement are sufficiently expensive that HVDC lines are only practical for lines that are long enough to bear the high terminal cost or as interconnections between asynchronous systems.

What's ahead

In the midst of a lot of uncertainty about what lies ahead for system designers and operators, lies a vision of an advanced transmission system that will be needed to cope with increasingly demanding conditions.

EPRI is developing a system called FACTS (Flexible AC Transmission System) that would overcome loop-flow problems and provide a more sophisticated degree of control through a combination of high-power electronic devices and computerized system automation.

Specifically, large solid-state switches, or thyristors, would be used in various types of controllers to manipulate ac current flow on transmission lines. With such a system, utilities would be able to increase the loading on existing transmission lines and handle more transactions without compromising reliability.

EPRI has launched a seven-year, $20-million research program devoted to FACTS. The project will be developed in two phases. The first will evaluate the technical and economic benefits and develop design specifications for specific power control devices. The thermal performance of present transmission systems also will be evaluated and overall control strategies developed.

The second phase, expected to start this year, involves developing hardware and demonstration tests on utility systems. Frank Young, director, electrical systems division for EPRI, says, "We need to follow a systems approach to FACTS. Although it could be implemented piecemeal, the pieces have to fit together. By the time prototypes of phase angle transformers and modular series capacitors are ready for demonstration, the strategies for integrating them into a transmission system must also be available."

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Long-life cable...

earth or installed in conduit.

To help member utilities prepare specifications for improved cables, EPRI has compiled valuable information into one easy-to-use digest (EL 6271-Distribution Cable Research Digest). It covers specifications for long-life cable, discusses economic considerations, and summarizes various completed cable research projects.

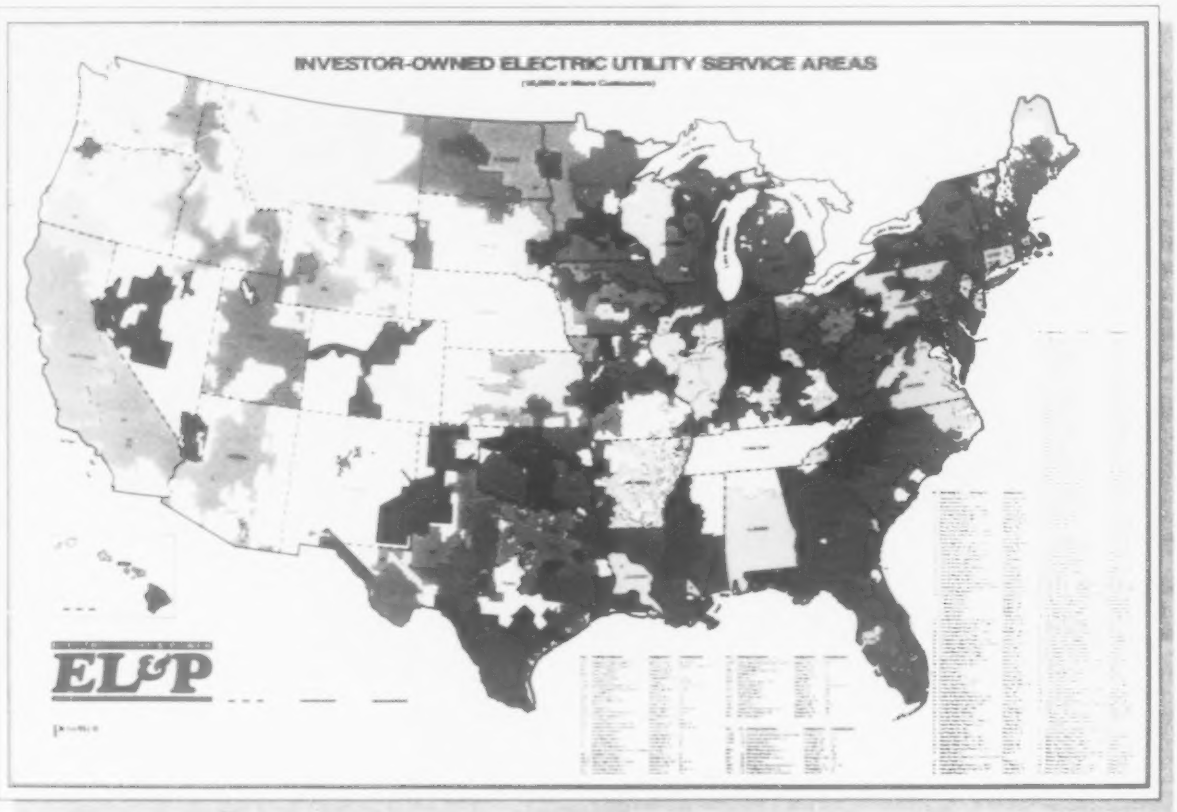
Case study

The cable-selection program has been sent to about 30 utilities. One utility that has used the economic analysis program reports that it incorporated investment costs, energy losses and replacement costs in its analysis. The results indicated that XLPTR distribution cable was the most economic for each of four aluminum cable sizes—#2, #2/0, 500 kcmil, and 1000 kcmil.

Jacketed cable

This study addressed only treeing—not concentric neutral corrosion—and the utility points out that a serious corrosion problem could make jacketed cable an economically justified option.

EL&P Wall Map
of Investor-Owned
Electric Utility
Service Areas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APRIL 1990

ELECTRIC LIGHT & POWER

EL&P

Volume 68, Number 4
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VOICE OF THE ELECTRIC UTILITY INDUSTRY

LATE NEWS

Holding companies Iowa Resources and Midwest Energy revealed merger plans on March 16.

Northeast Utilities Co.'s Chapter 11 reorganization plan for PSNH was "solidly approved" by most PSNH shareholder groups. Bankruptcy court confirmation may disallow objecting claims this spring; hearings begin this month. FERC OK'd NU's interim management plan, but transmission access concerns require resolution prior to the takeover. Aug. 1 is the target for approvals.

EPA will not request rehearing of the prevention of significant deterioration issue from the WEPCo decision (March, p.1). WEPCo/EPA discussions continue.

Seabrook—after 17 years, p. 3.

Clean air, acid rain

Senate, administration deal; toxic clause and scrubbers

WASHINGTON—The Bush administration and Senate forged a compromise on the Clean Air bill, S.1630, that the full Senate took up in heated debate on March 5. The House version was still in committee.

Details on the compromise and what its projected effects would be if passed were still sketchy as of mid-March. The "details remain to be defined," said an EPA staffer.

A summary of the compromise raised concern that utilities may have to install scrubbers or electrostatic precipitators to all coal-fired power in order to comply with the mercury removal portion of the toxics provision.

According to a summary of the bill "only particulate and mercury emissions are to be regulated with a maximum achievable control technology standard" for electric utility boilers. In addition, "The EPA is not authorized to require flue gas scrubbers to control emissions of hazardous air pollutants from utility boilers."

But EPA's David Ryan pointed out that state and local governments could require that utilities use scrubbers to meet or

Continued on page 14

10-yr, $500-M NAPAP results: Are emissions cuts too tough?

WASHINGTON—The draft report of the largest acid rain study in history concludes that sulfur-and nitrogen-based air pollutants cause most of the acidification plaguing sensitive lakes and streams in the Northeast.

But the $500-million, 10-year study also says there is no pending large-scale ecosystem collapse as a result of acid rain and that there's no apparent trend in the acidity of rainfall.

An integrated assessment, expected by the end of the year, is to compare about 25 pollution scenarios to help policymakers choose the levels and areas of pollution control. But Congress seems likely to forge a clean air package before then, using the administration proposal as a base (see story at left).

Results are not quick reading

The 28-volume, 15,000-page draft report of the National Acid Precipitation Assessment Program was unveiled mid-February at an international NAPAP meeting. The report, with 300 authors, and over 100 peer reviewers, revealed, in part:

- U.S. acid rain is not responsible for regional crop yield re-

Continued on page 16

Watkins: N-waste site by 2010 depends on courts

Mark T. Hoske
News Editor

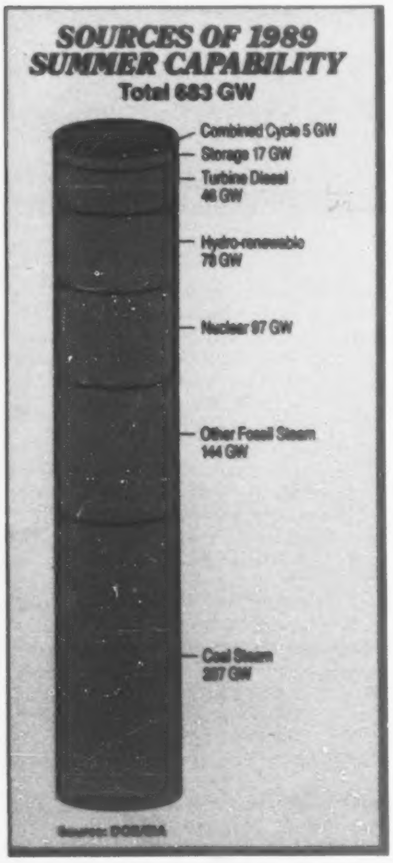
WASHINGTON—DOE Secretary James Watkins said meeting the extended 2010 deadline for completion of a high-level nuclear waste repository depends on the length of the current court cases with Nevada.

Watkins said the Department of Energy will study the cost of further delays, with a cost-benefit analysis of centralized nuclear waste storage versus expanding nuclear waste repositories on plant sites nationwide. Further, the department will seek to unlink the high-level site with the Monitored Retrievable Storage (MRS) facility as an intermediate solution to accept waste starting in 1998.

As previously reported, the DOE had filed suit against Nevada in U.S. District Court in Las Vegas for delay of permits to allow site characterization at Yucca Mountain, as Congress has required. Nevada has sued to halt characterization.

Nevada recently signed a petition to

Continued on page 19



Public will debate $717-M NOPSI sale

NEW ORLEANS—Public hearings will be held this month on a proposed $717-million city buyout of Energy Corp.'s New Orleans Public Service Co.

Negotiators said the Feb. 22 agreement in principle (*EL&P*, March, p.1) has resolved all issues that caused the July 1989 agreement to fall through.

The city council could decide in May, after the public hearings, if it wants to put the agreement into contractual language. It would include capacity contracts and purchase of NOPSI generating assets by 1996.

The buyout would include a small portion of Louisiana Power & Light Co. territory that serves New Orleans. LP&L is also an Entergy subsidiary. Officials expressed hope of completing a deal by year's end.

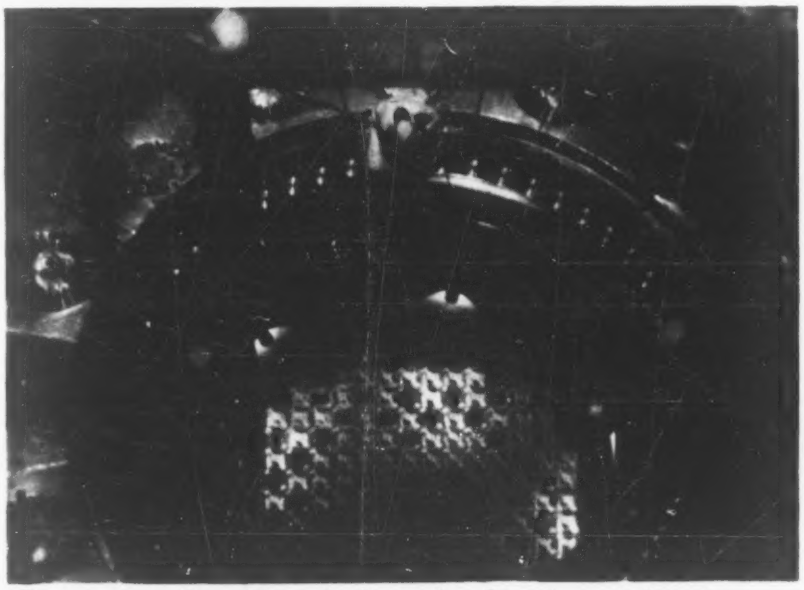
John J. Cordaro, group vice president for NOPSI and LP&L, said Entergy would "prefer to continue serving the City." He added, however, that the buyout threat has been "a sword over our head for six or seven years and we'd like it resolved."

Transmission access crumbled deal

Last year's deal crumbled when the verbal agreements were applied to paper. Transmission access topped a list of contentions.

Taxable bonds would finance the deal due to a 1988 law restricting use of tax-exempt financing for acquisitions of investor-owned utilities.

State regulators want an emissions auction to boost market liquidity. They also recommend a flexible emissions baseline, p. 3.



Comanche Peak loads fuel...at last

The fuel-load team at Texas Utilities Inc.'s Comanche Peak nuclear Unit 1 lowers the last of 193 fuel assemblies into the reactor vessel. Each $400,000 fuel assembly contains the energy equivalent of 108,000 tons of lignite coal costing $1.3 million; 1.379 billion ft^3 of gas at $3.4 million; or 250,000 bbl oil at $4.6 million. The tops of the 13-ft, 1500-lb fuel units are visible through the blue-lit water. The darker assemblies contain control rods. On either side of the vessel opening are the reactor-head guide-pins. Plugs covering the threaded holes for the reactor head bolts border the opening. The larger access covers protect instruments. The Westinghouse-supplied fuel was loaded Feb. 9-14 in the 1150-MW reactor. Construction began in October 1974; low-power testing started in early March. The cost of the two units is $9.1 billion. (*EL&P*, March, p.3)

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NEWS BRIEFS

JILL MINNER, Special Projects Editor

Idaho Power trys to rid all substations of PCBs

Idaho Power Co. will launch a five-year campaign to rid its 200-some substations of polycholrinated biphenyls (PCBs), according to the utility. Even though the PCB levels in Idaho Power's substations are well within federal safety standards, the utility is voluntarily seeking to make the sites PCB-free. According to Idaho Power, removing the PCBs will eliminate the long-term costs associated with monitoring and testing substation equipment and grounds for PCB contamination. Nine employees will be added to the utility's transformer shop, where they'll work with division substation personnel to clean or replace PCB-contaminated equipment and remove any tainted soil.

NU to lease Stanley Works hydro station and buy HEC Energy

Northeast Utilities said it has agreed to lease the 10-MW Rainbow Dam hydroelectric generating station from the Farmington River Power Co. (FRPC), a subsidiary of The Stanley Works. According to NU, it will lease the station, located in Windsor, CT, for 30 years and will purchase FRPC's transmission and other assets. Under the agreement, the Connecticut Light and Power Co., NU's Connecticut operating company, will maintain Rainbow Dam as a functioning generating plant. Beginning in 2020, the Rainbow lease may be extended for six, 10-year periods at $250,000 per year, according to NU. The utility expects the $7.5-million transaction, which must be approved by the Securities and Exchange Commission and the Federal Energy Regulatory Commission, to be completed by September 1990.

NU has also announced plans to acquire HEC Energy Corp., a supplier of engineering, design, and installation services associated with energy conservation measures. According to the utility, HEC's assets will be acquired by a newly formed, unregulated subisidiary of NU.

DOE plans initiatives for energy efficiency and renewable energy

The Department of Energy recently announced a series of initiatives to increase energy efficiency and the use of renewable energy sources. DOE said it plans to spend $336 million on the initiatives over the next six years if technical progress is made as anticipated.

The initiatives include:

- relighting federal facilities
- relighting commercial buildings
- improving utilities' planning for efficiency
- accelerated building guidelines and standards
- energy analysis and diagnostic centers
- energy from municipal waste
- modern manufacturing technology for photovoltaics
- cost-competitive ethanol fuels
- speeding development of solar detoxification of hazardous wastes
- a new laboratory at SERI
- expanding hydropower

According to DOE, savings from the energy efficiency initiatives through the year 2000 could exceed $32 billion.

O&R fights tax policy on consumers' rebates

Orange and Rockland Utilities, Inc. said it is currently seeking support from Congress in its fight to reverse a new Internal Revenue Service policy to tax the rebates consumers receive for purchasing energy efficient equipment. "This tax not only unfairly punishes the average person for making an energy-efficient purchase," stated O&R Chairman and CEO James F. Smith, "but also hampers a valuable tool that utilities have used in encouraging the wise use of our nation's energy resources." Smith has urged committee members to ask the IRS to reconsider its position. "I believe this new IRS policy will severely cripple our energy conservation efforts by removing the incentive for our customers to participate [in rebate programs]," he added. According to Smith, the National Association of Regulatory Utility Commissioners has passed a resolution opposing the IRS' decision.

Utilities benefit from recycling programs

Public Service of New Hampshire and Pennsylvania Electric Co. are helping themselves as well as the environment by participating in recycling programs. PSNH expects to recycle more than 65 tons of paper and aluminum cans annually with its new in-house recycling program. "It currently costs us about $10,000 a year to dispose of paper," stated Blair W. Gourley, PSNH supervisor of officer services. "But recycling would eliminate that cost and produce an additional return of an estimated $10,000 to the company for a total savings of about $20,000. Add to that the environmental benefits of reducing incineration and easing the burden on landfills, and it's clear that recycling is the way to go."

Penelec reported that it sold about 12 million lb. of recyclable material, along with other scrap and salvage, for an estimated $2.1 million. Waste materials and timber were sold for $340,000. "About 35 percent of the material was sold as reusable. This recycling conserves energy and natural resources and eases the stress on an overburdened waste-disposal system," explained Harold M. Class, PSNH vice president of materials and services.

Oregon PUC urges utilities to improve conservation efforts

In a report adopted by the Oregon Public Utility Commission, 14 recommendations were made to the state's three major electric utilities to improve their energy conservation efforts. The commission said that if Pacific Power & Light Co., Portland General Electric Co. and Idaho Power Co. made the improvements, energy equivalent to the amount produced by two large thermal generating plants could be saved. According to the PUC, the recommendations include activities and programs aimed at residential, commercial and industrial customers, and the utilities must file semi-annual reports with the commission on how they are meeting these goals. The report, published jointly by the PUC and the Oregon Department of Energy staff, is also intended to provide a framework for the commission to use in reviewing the utilities' least-cost plans.

Many utilities make energy conservation programs a priority

In an effort to encourage customers to save energy, many utilities have either launched or are adding to their existing energy conservation programs.

Minnesota Power received approval from the Minnesota Public Utilities Commission for its 1990 Energy Conservation Improvement Program. In conjunction with other organizations, the utility plans to use over half of its conservation budget to assist low- and moderate-income homeowners and renters in improving the energy efficiency of their dwellings.

Pacific Gas and Electric Co. said it is doubling its efforts to promote customer energy efficiency by creating several major programs. The programs were a result of the California Collaborative, a joint study of ways to improve energy efficiency. Consumer and environmental organizations, government agencies and utilities participated in the study.

Philadelphia Electric Co. is launching a new program designed to help customers conserve energy and save money on electric bills. The utility said its program, which will be phased in over a three-year period, offers residential and business customers incentives and rebates, complimented by audits and consulting services.

Toledo Edison's pilot program, Energy Cost Savers, emphasizes energy-efficient light bulbs and conservation. According to the company, the program can help customers cut their electric bills immediately by lowering consumption, and ultimately could help to keep future rates lower.

Wisconsin Electric's Smart Money Energy Program lets customers receive cash, savings bonds and zero-interest loans for installing efficient electrical equipment and getting rid of inefficient appliances. More than 175-MW of power has already been saved with the program, said WE.

PSNH names chairman

Public Service of New Hampshire President and CEO John C. Duffett has been appointed to the additional position of chairman. Duffett replaces William J. Scharffenberger who resigned after serving as chairman since September 1988. According to the utility, Scharffenberger is a specialist in administering companies in Chapter 11 or facing other critical financial situations. "The final stages of resolving the PSNH bankruptcy are now in view, and the time seems appropriate for me to reduce my involvement with the company," stated Scharffenberger in his letter of resignation. Duffett has been president and CEO since September 1988.

Utilities fined by NRC

The U.S. Nuclear Regulatory Commission recently proposed the following fines:

Arkansas Power & Light Co.
A $75,000 fine for apparent violations of NRC requirements at the Arkansas Nuclear One nuclear plant.

Carolina Power & Light Co.
A $75,000 civil penalty for alleged violation of NRC requirements at the Brunswick nuclear power plant.

Commonwealth Edison Co.
A $100,000 fine for failing to properly evaluate the safety significance of an alteration in ventilation systems at the Zion nuclear plant.

Georgia Power Co.
A $7,500 civil penalty for alleged violation of NRC security requirements at the Vogtle nuclear power plant.

TU Electric
A $30,000 fine for apparent violations of NRC requirements associated with several check valve failures in the auxiliary feedwater systems at the Comanche Peak Steam Electric Station.

Washington Public Power Supply System
A $50,000 fine for an alleged violation of NRC requirements involving environmental qualification of electrical equipment important to safety at the Washington Nuclear Project-2.

In other news, the Nuclear Regulatory Commission Atomic Safety and Licensing Board has approved the settlement of a proceeding between the NRC staff and **Alabama Power Co.** regarding a $75,000 fine for an alleged violation of technical specification requirements governing operation of the Farley nuclear power plant.

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COMMENTARY

The quest for excellence continues

For the past 20 years I have had the privilege of serving on the Review Committee for the Edison Award, the highest honor to be conveyed annually on an investor-owned electric utility by the Edison Electric Institute. The committee selects at least two electric utilities that have made the "most distinguished contribution to the growth and development of the electric light and power industry for the convenience of the public and convenience of all." EEI's group of regional nominators makes recommendations to the committee. Utilities with the most significant achievements are invited to submit formal presentations for the final award, which is presented at EEI's annual convention.

It hasn't been an easy task over the years. Nominators recommendations often have been provincial, politically attractive but less than substantial. Too often it has been hard to pick two whose achievements merited consideration. We exercised our prerogative of nominating our own selections.

But this year, the committee's task was easier. About two dozen recommendations were narrowed to five companies:

- Entergy Corp. for its synergistic system-wide integration of business and social concerns into the Project Olive Branch program. This comprehensive program replaced litigation with negotiation of thorny regulatory issues revolving about the Grand Gulf nuclear plant. It also addressed the social and educational needs of its service territory.
- Pacific Gas & Electric Co. for its outstanding response to the Loma Prieta earthquake in October 1989.
- PacifiCorp for its approach and execution of the Utah Power & Light Co. merger and especially for recognizing transmission access as a potent and profitable resource.
- Pennsylvania Power & Light Co. for its sensitivity to the broad range of needs of disadvantaged customers that lead to the creation of its Customer Assistance and Referral Evaluation Service (CARES) program; for an outreach program that aims to resolve conflict between communities and the utility; and for continued exemplary performance at its Susquehanna Nuclear Plant.
- South Carolina Electric & Gas Co. for extraordinary service and humanitarian effort in the aftermath of Hurricane Hugo, which blacked out three-quarters of its customers under devastating circumstances.

All five are to be congratulated. The final judges will have a difficult task choosing a single winner.

At long last...Seabrook lives

One of the electric power industry's sorriest, most devastating, and frustrating eras has finally ended, with the refusal of the U.S. Court Appeals to further delay the issuance of a full-power license for the Seabrook Nuclear Power Station (see related news stories on pages 1 and 3). Seabrook is ascending to full output for the power-thirsty, capacity-shy New England grid. It has taken 17 years to complete and license Seabrook, at a cost of $6.7 billion, more than seven times the initial projected cost of the project.

Consumers of Seabrook power now face paying for the highly inflated cost of the facility that has resulted from the dilatory efforts of the governor of neighboring Massachusetts, its senior senator, Ted Kennedy, and a host of lessor politicians and "friends" from the Bay State and elsewhere.

From the very beginnning, Seabrook was a David and Goliath project...a small, but well-managed small utility tackling a giant engineering project that was quickly politicized beyond the capability of the utility. The sheer magnitude of the project, with skyrocketing inflation of the mid-1970s, the anti-nuclear backlash of the Three Mile Island 2 accident, and continued opposition by environmental groups and Massachusetts officials finally pushed Public Service Co. of New Hampshire into bankruptcy, further lengthening the licensing process.

But despite these enormous obstacles, Seabrook now is a reality. It should serve as a testimonial to the failure of the regulatory process to forsee and deal with real-world issues affecting the owners of major engineering projects and their customers.

Robert A. Lincicome, Editor-in-Chief

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LETTERS

'We' and 'they'

Congratulations on your "We..." editorial (March *EL&P*, p.4). As you know, this is what I've always believed in, and now it's good to see movement in this direction.
John Turrel
Mt. Vernon, IL

Editor's note: Thanks for the good words, John. Perhaps the concession by the various organizations within the electric utility industry haven't produced earth-shattering results yet, but the moderation of positions and the cooperation that has occurred certainly are welcome steps in the right direction. As one who led the Farm Electrification Council so well for many years, nobody knows better than you how supposedly irreconcilable political differences have hindered potential industry progress in the past. Great to hear from you again.

Unisex references for slow learners

You still don't get it. Although this adjective (as in *feminine* readers) might apply to some men and women, it's still discriminatory. It must be difficult to give lip service to equality when you haven't resolved it in your own mind!

Just an observation. Keep up the good work and sense of humor.
Undecipherable signature

Editor's note: So soon old and so late smart, to quote an old Pennsylvania Dutch saying. I think the problem goes back to the fact that when I was growing up, women considered it a compliment to be considered to be feminine. It's hard to break life-long concepts.

Family ties

There's an aspect of electric utility life—in this fast-changing era spawned of competition for generation by cogens, self-gens and independents—that I've not seen addressed as yet. Perhaps my broaching it here may lend legitimacy to it as an issue.

When one's association with a given industry is as long as some of us have been in the electric utility business it's only a matter of time until we realize—in the words of the song—that "We Are Family." It's the kind of family relationship that often strains our personal family ties on vacation... such as when a power plant silhouetted on the horizon struck fear in each of my family's hearts that dad was again going to steal precious hours from their vacation time by detouring through another power plant while they sat in the car!

"Don't you think it's going a bit too far," was the comment of my remarkably tolerant wife that made me change my ways, but the urge persists. I enjoy the spirit of comradery among us "utility types" (a curious phrase that so often has me wondering what those on the outside really mean when they characterize us so), especially when strangers turn out to be "family!"

For instance, take the time when I was doing the "parents' shuttle," the term my wife and I coined to describe the thankfully-past phase of our lives when we shuttled between college and home, alternately depositing and retrieving collegiate offspring. I was alone on this particular run to the Harrisburg, PA, area because the confines of our tiny oriental automobile dictated that there was room for only two passengers, given the amount of stuff to be lugged home with my daughter on that trip. The six-hour journey necessitated stopping for nourishment. I chose Howard Johnson's near Wilkes-Barre. The bus in the parking lot, with diesel engine gurgling, gave off more than just the foul fumes in the air. It signaled that a long wait lurked inside the twin glass doors. Undaunted, I pressed on, finding the place mobbed with a senior citizens' travel group. Seeing an open seat at the counter next to a gentleman much older than I, I pounced on it and quickly agreed with the waitress about what I'd enjoy for my supper.

The man and I exchanged pleasantries and—before either of us sensed what had happened—discovered our "utility types" bond. He was well into his retirement from Pennsylvania Power & Light Co., and extolled the virtues of his satisfying career, first, and now his retirement. My side of the conversation dealt with the goings on at Northeast Utilities (NU), my company. "Never heard of that one," he responded, and spoke of his work with "lines and meters." I filled him in on the power plants where I "turned the crank," and the high-tech plant computers with which I was involved at the time.

"I like meeting people from electric light companies, like you," he said. "It helps me stay in touch."

It was then that I remembered the pocket-sized version of NU's annual report that I carry in my wallet. He accepted it appreciatively as a souvenir of our chance encounter.

Another instance involved our children. I was completely surprised when a semblence of the electric utility bond surfaced in our children. It happened in the year of our nation's bicentennial, on a Florida vacation trip day at the beach in Sarasota, FL. At the edge of the parking lot was a line truck from the area's utility. Two figures were slumped in the front seats, their heads resting on the sills in apparent slumber.

Upset by what they interpreted as sleeping on the job, Jeff and Laura cried out for me to do something. I was in a classic no-win situation. If I acted on their plea, I risked bodily harm from a couple of burly linemen. My failure to act, however, would label me a coward, not the father my children respected. Glancing at my watch, I began a delaying tactic and reasoned "...these men are on their lunch hour. Watch. When it's 12:30 I bet they'll go back to work."

As we spread our blanket on the white sand, the kid's attention was riveted to the far side of the parking lot. The clock ticked on. I whispered to my wife, "When I was their age I didn't give

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EPRI limits report availability

PALO ALTO, CA—The Electric Power Research Institute put in place new policies regarding availability of reports resulting from EPRI-sponsored research.

According to Barbara Klein, spokesperson for the institute, *member U.S. utilities* still may order research reports at no charge.

The biggest change, however, is that *non-member U.S. utilities* will not be allowed to order the reports at all.

And prices to other non-members, including foreign utilities, have been revised to more adequately reflect costs of the research projects on which the reports are based.

The new policies are a radical departure for the organization, which formerly was quite liberal in sending out reports, usually at low prices, to anyone who wanted to buy them.

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LATE NEWS

Bankruptcy court OK'd the PSNH reorganization, the NU takeover, and rate hikes of 38.5%; regulators' approvals are needed. **After "Global warming"** disputes, President Bush requested studies to consider economic and human effects of any responses. **GPU and DQE Inc.** agreed to build a 200-mi, 500-kV, 1.5-GW line for $480M from W. PA to NJ. **The NRC approved** a full-power license for Comanche Peak Unit 1. **GM suggested it** would market an electric car in the U.S.

Senate passes Clean Air bill

NEWS ANALYSIS

WASHINGTON—Many superlatives—good and bad—have described the Senate's landmark clean air bill since its 89-11 approval on April 3. With an estimated eventual cost of $21 billion *annually*, "expensive," is the one word most people agree upon. The acid rain portion alone may cost $7 billion a year.

Cost estimates range widely on the Senate bill, the House version (see story, right), and the still-anticipated compromise.

The EPA's David Ryan said the Senate bill wouldn't cost $21 billion annually until fully implemented in 2005. Over the next three years, it would cost less than $5 billion per year, and less than $11 billion annually in the late '90s, he said.

But the cumulative effects of more than 100 amendments, vague language, and eventual Environmental Protection Agency interpretation are all wild cards. As was the case with the Clean Air Act of 1977, the industry may not know the law's full cost until testing and litigating its language and limits.

As expected, industry trade groups and environmental groups said the bill could have been "better."

The debate's fury has been fed in-part by the environmental fervor surrounding Earth Day's 20th anniversary, April 22. Pent-up demand after years of clean air discussion in Congress also has contributed. Few legislators want to be tagged as anti-environmental. But legislators also have added amendments to reflect constituent views or those of special interest groups.

Political analysts' predictions vary on the timing of the House bill and a Senate/House compromise. Some say it could become law as early as July; others contend it will run down to the wire at the end of the session in October.

Apart from official White House cau-

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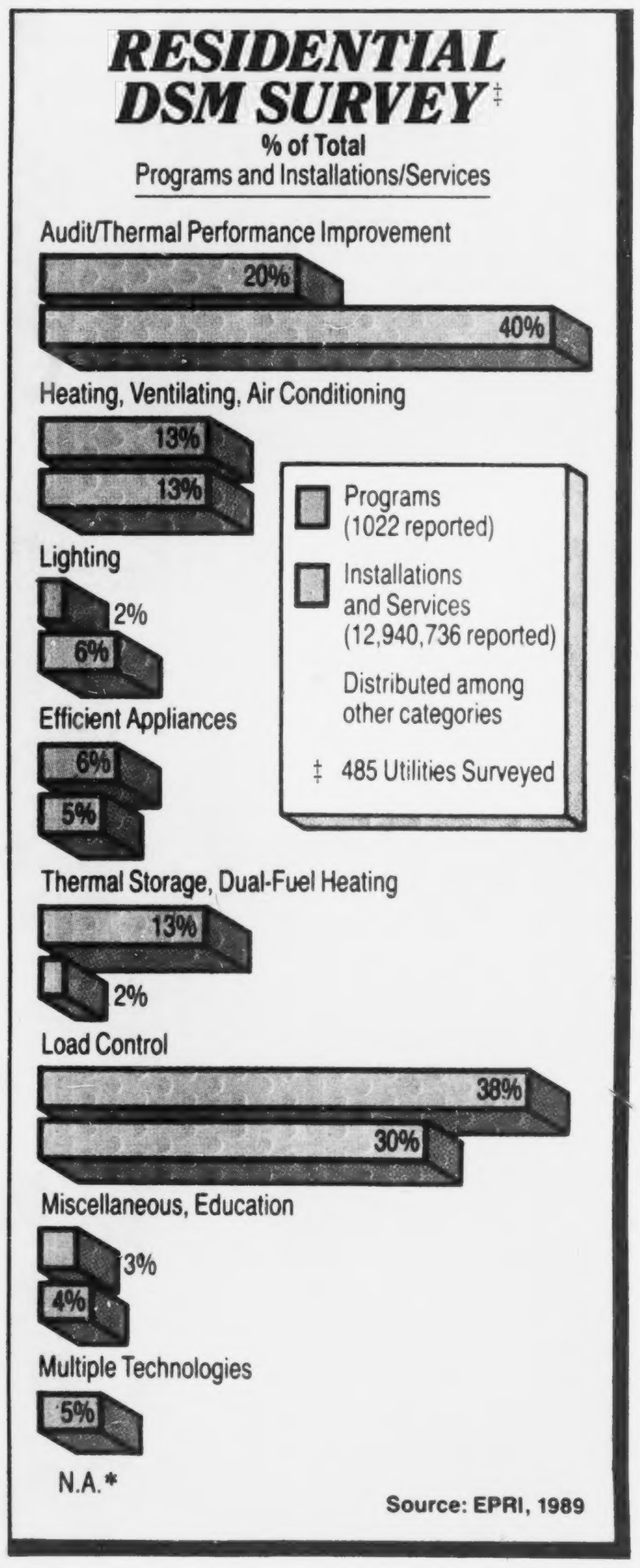

Source: EPRI, 1989

House action expected soon

WASHINGTON—The House was expected to begin debate on Clean Air as early as late April. The House Energy & Commerce Committee passed H.R. 3030 by 42-1 after a lengthy closed-door debate.

The annual cost of the House Clean Air bill eventually would be about $20 billion, including about $4 billion a year for the acid rain portion. The legislation remained fluid, according to one Environmental Protection Agency staff-

Continued on page 8

C-U files Ch. 11; rates: REA vs. PUC; merger talks on hold

MONTROSE, CO—Colorado-Ute Electric Association voluntarily filed for reorganization under Chapter 11 of Federal Bankruptcy Code, in part due to a rate reduction by the Colorado Public Utility Commission.

A reorganization plan is required 120 days after the March 30 filing.

Negotiations of the proposed merger of C-U and Tri-State Generation and Transmission Assocation have been suspended (but not terminated) as a result of the March 8 PUC tentative rate decision to cut wholesale rates to 4.2¢/KWh from 4.4¢/kWh to C-U's 14 member distribution systems.

As a result of the PUC decision and other factors, C-U said, Tri-State has withheld advances of funds under the revolving loan agreement, and C-U can no longer operate without protection from creditors.

Despite the filing, Tri-State members directed the board and management "to continue to pursue, at its own discretion and pace, within the bankruptcy proceeding...all merger and third-party transaction possibilities."

Regulators battle, for a change

C-U's position was confused by a conflicting rate order by the major C-U creditor, the Rural Electrification Administration, which ordered a rate increase to 5.2¢/kWh, with an interim

Continued on page 10

Partners dedicate Midland Cogeneration Venture

CMS challenges PSC

Mark T. Hoske
News Editor

MIDLAND, MI—Hoopla surrounded the MCV Partners' dedication of the one-of-a-kind 1370-MW Midland Cogeneration Venture on April 9. About 400 people attended.

The congratulatory event didn't seem to be marred by recent state regulatory challenges of the transfer of Consumer Power Co. MCV assets to the unregulated CMS Energy subsidiary.The utility has appealed in court regulators' decisions on rates and the amount of power the utility can purchase. Consumers Power's parent, CMS Energy Corp., is 49-percent MCV owner.

MCV went commercial in March. The 12-gas-turbine, combined-cycle plant also creates 1.35 mmlb/hr process steam. The conversion cost under $650 million; the total project, $2.5 billion. Original owner Consumers Power had spent $4.2 billion on the nuclear portion.

Federal and state offi-

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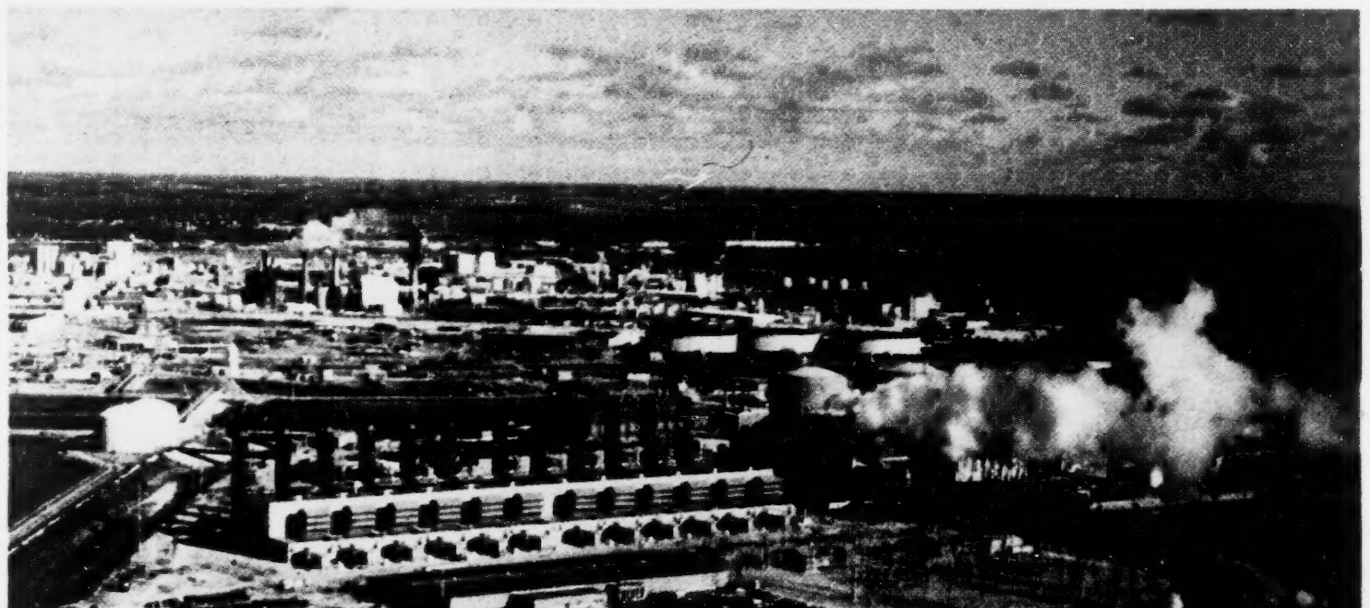

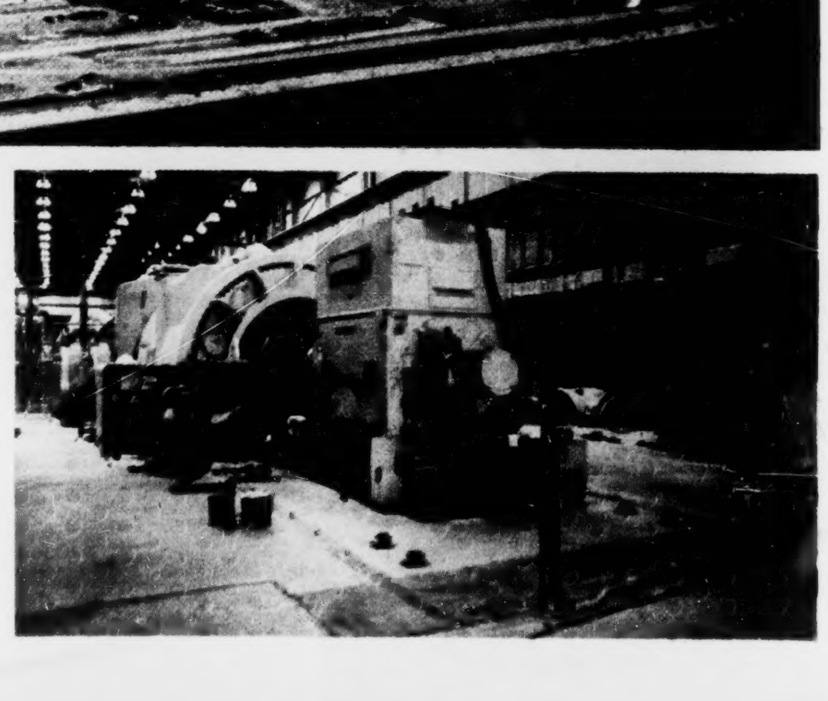

MCV Partners dedicate the 1350-MW Midland Cogeneration Venture. The Michigan plant went commercial in March and is the first conversion of a cancelled nuclear plant to natural gas. The conversion cost was under $650 million; project assets total $2.5 billion. Original owner Consumers Power Co., which spent $4.2 billion on the cancelled nuclear portion, is still tangling with regulators on issues related to the transfer of assets and a financial recovery plan.

NEWS BRIEFS

JILL MINNER, Special Projects Editor

MGE, NSP sign deal

According to Madison Gas and Electric Co., it has signed a low-cost power deal with Northern States Power Co. Under the agreement, MGE will be supplied with direct access to NSP's sources of economic generation in Minnesota, North Dakota, South Dakota and Canada. NSP will also be able to buy power from MGE at certain times, according to the contract. As of early April, the agreement was still pending approval of the Federal Energy Regulatory Commission. MGE said it has similar arrangements with other Wisconsin investor-owned utilities.

DOE proposes rule to protect whistleblowers

Secretary of Energy James D. Watkins said a new rule has been proposed that would prohibit employers under contract to the Department of Energy from retaliating against individuals who report unsafe, wasteful or illegal practices to DOE. "Preventing retaliation against contractor employees for raising safety, environmental, and management concerns is critical to our efforts to assure that all DOE facilities are well-managed, efficient, and safe," stated Watkins. "We must protect these people so that they will feel free to come forward with their good-faith concerns. The proposed rulemaking would give us the means to guarantee this protection," he added. The new rule would broaden protections already available and establish comprehensive procedures to make the protections effective, according to DOE.

Penelec cuts costs with voluntary severance

In an effort to cut costs, Pennsylvania Electric Co. offered its 500 employees a voluntary severance plan. According to Penelec, a total of 42 employees accepted the plan. "Penelec has been seeking opportunities to reduce costs through restructuring its organization in a manner that reduces through attrition, the total number of non-bargaining employees. This voluntary severance plan accelerated this purpose," explained Penelec President Robert L. Wise. He added that there are no current plans for layoffs at the General Public Utilities Corp. subsidiary.

NIPSCO adopts plan to protect shareholders' interests from takeover

NIPSCO Industries Inc., parent company of Northern Indiana Public Service Co., said it has adopted a share purchase rights plan to protect its shareholders' interests in the event of a takeover. NIPSCO stated that the plan's adoption was not in response to any specific attempt to acquire control of the company. "The plan is intended to encourage any potential acquirer to negotiate fairly with the board. The plan in not intended to prevent an acquisition of the company that is in the best interests of the shareholders, or to prevent a proxy contest," explained NIPSCO Chairman and CEO Edmund A. Schroer.

UtiliCorp announces venture into the UK

UtiliCorp United Inc. said it has invested $1.7 million in Norland Pipelines Ltd., a British company specializing in oil and gas related ventures. According to UtiliCorp, Norland was formed to develop opportunities in the transportation, processing, treatment, handling and delivery of natural gas, oil and related hydrocarbon products. UtiliCorp, a 19.9-percent equity owner, will be joined by British Steels PLC and several individual investors with energy experience. UtiliCorp said this is its first venture in Europe.

Bush visits PEPCo's Chalk Point Plant

President George Bush recently visited Potomac Electric Power Co.'s Chalk Point Generating Station in Maryland. The President was accompanied on his tour by Secretary of Energy Admiral James Watkins, Environmental Protection Agency Administrator William Reilly, PEPCo President Edward F. Mitchell and Chalk Point Plant Manager Hula C. Edmonds. During the visit they stopped at the utility's Aquaculture Center where young striped bass are raised for release into a tributary of the Chesapeake Bay. "I'm very impressed with PEPCo's fish program, because raising a million 'stripers' to replenish the Chesapeake Bay is a significant environmental contribution," said Bush. "You've got a wildlife sanctuary here—that's very good citizenship," he added.

Demand for electricity to grow in '90-'91: EIA

Growth in demand for electricity is projected to average 3.2 percent in 1990 and 1991, according to the Energy Information Administration's *Short-Term Energy Outlook* report. EIA said it expects the majority of the growth to take place in the commercial sector of the economy. Petroleum demand in the United States is expected to remain virtually flat in 1990, according to the report. The expected lack of growth is due to slower economic expansion, continued improvements in automobile efficiency, and reduced oil use at electric utilities as nuclear and hydroelectric power availability improves, said EIA.

USCEA poll finds some environmentalists view nuclear as important

The results of a national poll, conducted by Cambridge Reports Inc. for the U.S. Council for Energy Awareness, revealed that a majority of environmentalists, "think nuclear energy *will* and *should* be important in meeting the nation's future electricity needs." USCEA said that 18 percent of the 1250 American adults polled in the random sample were identified as environmentalists. Sixty-nine percent believe nuclear energy will be important and 58 percent think it should be important, according to the poll. Fifty-six percent were aware that nuclear electric plants emit no greenhouse gases, compared to 45 percent of other Americans. "This polling research provides the first signs of a new 'mainstream environmentalism' that is more realistic and objective in its view of energy sources," stated USCEA President Harold B. Finger. "Other Americans believe nulcear energy is important in meeting our electricity needs, but this poll showed they are less aware of nuclear energy's environmental benefits. With increasing public concern about the environment, maybe this knowledge gap will close," he added.

Homes with teens use over 50% more energy, says Consumers Power

After conducting a new energy use trend analysis, Consumers Power Co. reported a sharp difference in overall energy consumption between households with teenagers and those without. On average, approximately 54 percent more electricity was used by households with teens, according to the utility. In addition, one out of six homes served by Consumers Power includes teenagers. "Consumers Power's challenge in serving the energy requirements of younger, higher consumption customers is twofold. We must ensure that needed electric and gas supplies will be there, and provide quality information on energy conservation measures," stated Paul A. Elbert, Consumers Power vice president of marketing, sales and wholesale power transactions.

BE uses new DSM lead gathering system

Boston Edison Co. plans to use a new lead gathering system at its commercial trade shows this year. The ITS System, created in cooperation with Breakaway Presentations Inc., will be used to focus on three of the utility's demand-side management programs: cool storage, efficient lighting, and generator assistance. The system employs an interactive touch-screen computer to gather information on prospective DSM clients. Boston Edison's computer and exhibit will travel to 10 trade shows this year, according to the company.

FERC chairman named to NARUC committee

Federal Energy Regulatory Commission Chairman Martin L. Allday was named to the Executive Committee of the National Association of Regulatory Utility Commissioners. Allday, who took over as chairman of FERC in November 1989, was previously Solicitor for the U.S. Department of the Interior. As an executive committee member, he will assist in formulating NARUC policy on issues relating to the regulation of electric, gas, transportation, telephone, water and sewer services.

WV Power head chosen

West Virginia Power, a division of UtiliCorp United Inc., has appointed George B. Kitchens president. Kitchens, previously vice president-administration for the utility, succeeds the retiring James E. Harden.

Utilities fined by NRC

The U.S. Nuclear Regulatory Commission recently proposed the following fines:

Baltimore Gas & Electric

A $100,000 fine for alleged failure to comply with NRC safety requirements for procedural problems at Units 1 and 2 of the Calvert Cliffs nuclear power plant.

Consumers Power Co.

A $75,000 fine for violations of NRC safety requirements in the design of pipe-support modifications at the Palisades nuclear power station.

Indiana-Michigan Power

A $75,000 fine for one violation of NRC safety requirements for mechanical problems at Unit 2 of the D.C. Cook nuclear plant.

Pacific Gas & Electric Co.

A $50,000 fine for alleged violations of NRC requirements involving the operability of a safety system at the Diablo Canyon nuclear power plant.

GSU nuclear plant gets top ratings from NRC

Gulf States Utilities Co. said the Nuclear Regulatory Commission has given its River Bend nuclear power plant the highest possible performance ratings in three categories: plant operations, radiological controls, and emergency preparedness. After the NRC performed its Systematic Assessment of Licensee Performance on the 940-MW plant, officials noted that, "strong management support for excellence continued to be evident."

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Nuclear industry surpasses performance goals early

ATLANTA—Several 1990 performance goals for commercial nuclear power plants, set in 1986, were surpassed in 1989, according the Institute of Nuclear Power Operations annual report.

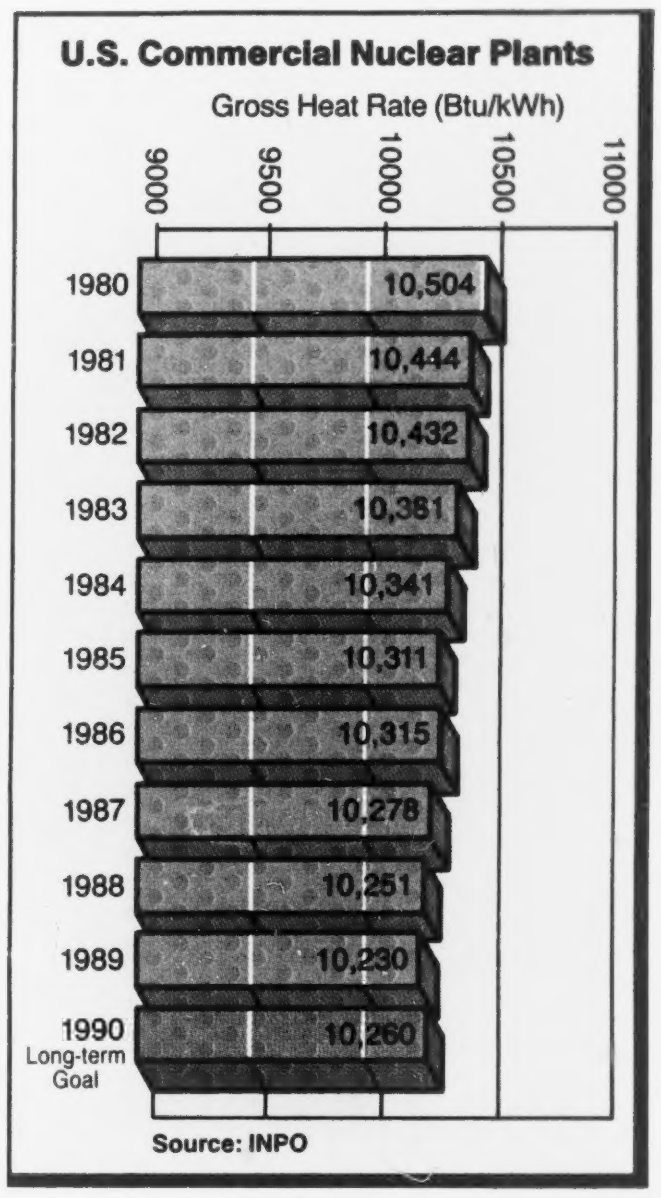
Those were:

- Boiling water reactor (BWR) collective radiation exposure in man-rem per unit: 442 in 1989, compared to the 1990 goal of 469. Exposures in 1985-88 were: 800, 622, 521, and 511. In 1980 exposure was 1230.
- Average gross heat rate per unit in Btu/kWh: 10,230, compared to the 1990 goal of 10,260. Heat rates in 1985-88 were: 10,311, 10,315, 10,278, and 10,251. In 1980 the heat rate was 10,504.
- Volume of low-level solid radioactive waste for BWR in m^3/unit: 313, compared to the 1990 goal of 466. Waste volumes in 1985-88 were: 797, 493, 459, and 312. In 1980 waste volume was 1113.
- Volume of low-level solid radioactive waste for PWR in m^3/unit: 167, compared to the 1990 goal of 213. Waste volumes in 1985-88 were: 334, 211, 194, and 169. In 1980 waste volume was 586.

Other goals attainable

Other performance indicators were within the industry's reach in 1990, said INPO's Angelina Howard. These other performance indicators were:

- Pressurized water reactor (PWR) collective radiation exposure in man-rem per unit: 292 in 1989, compared to the 1990 goal of 288. Exposures in 1985-88 were: 425, 397, 368 and 345. In 1980 exposure was 597.
- Unplanned automatic scrams (shutdowns) average per unit: 1.8, compared to the 1990 goal of 1.5. Scrams in 1985-88 were: 4.3, 3.9, 2.7, and 2.1. In 1980 scrams were 7.4.
- Unplanned safety system actuations average per unit: 0.9, compared to the 1990 goal of 0.8. Safety system actuations in 1985-88 were: 1.3, 1.2, 0.9, and 0.8.
- Industrial safety lost-time accident rate, number per 200,000 manhours worked: 0.25, compared to a 1990 goal of 0.19. The numbers 1985-88 were: 0.64, 0.40, 0.34, and 0.30. In 1980 the number was 1.36.



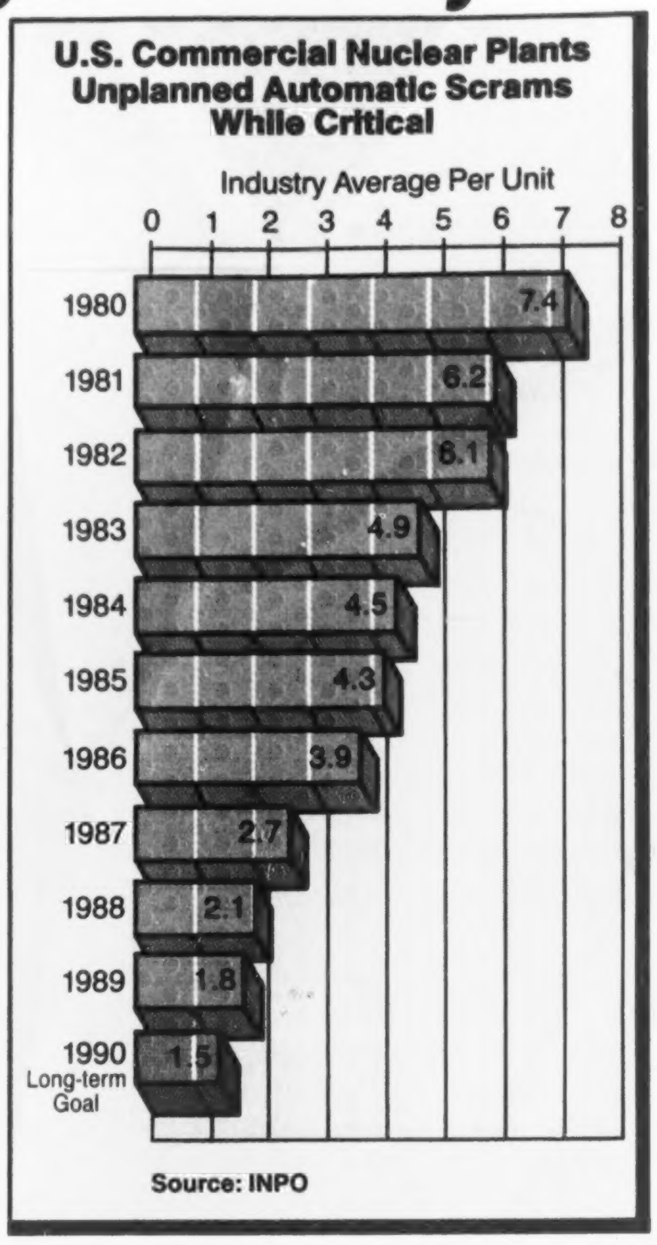
Source: INPO

Number of exposures up in 1988

Some statistics were clearly worse, according to a recent report by a consumer advocacy group, Public Citizen. The study, citing 1988 data from the Nuclear Regulatory Commission—the most recent available—said 105,265 workers were exposed to measurable radiation.

The study said the number of workers exposed in 1986 and 1987 were 100,992 and 104,511, respectively.

A spokesperson for the U.S. Council for Energy awareness explained that those numbers also represent an increase in the total number of industry workers and more plants. Both the average number of workers exposed per plant and the amount of exposure per worker decreased from 1987 to 1988, USCEA pointed out.



Source: INPO

NERC warns of likely supply shortage

PRINCETON, NJ—"Risks to a reliable supply of electricity have never been greater or capacity margins tighter," said William H. Clagett, chairman, North American Electric Reliability Council (NERC).

In NERC's 1989 Annual Report, Clagett pointed out that it's not the uncertain growth in demand (which may well exceed the projected 2 percent) but rather the loss of flexibility to respond to that growth. If the growth trend continues, he said, supply deficiencies in the eastern half of the U.S. and Canada are likely in the early 1990s.

Generation shortfall

Even though utilities are planning to add 92,900 MW over the next 10 years, Clagett adds, 43 percent are *not yet under construction* and based on normal construction times, some will not be completed on time.

Furthermore, over 20 percent of planned additions are non-utility generators over which utilities have no control. Plus, of the 36 percent already under construction, there is some risk of those not being completed on time.

Jack C. Wells, chairman, engineering committee, said, "Mother Nature, in several major instances this year, brought into clear focus the value of a reliable supply of electricity. Hurricane Hugo, the San Francisco earthquake, the solar magnetic disturbance in Quebec, and the sustained unusually cold December temperatures in the U.S. played havoc with electricity supplies in portions of several Regional Councils."

Hurricane Hugo left 1.25-million people out of service in North and South Carolina; caused extensive damage to the transmission system in South Carolina; and left a $180-million price tag for labor and material to restore the damaged T&D systems.

"This year, NERC introduced a multifaceted education program to help electric utilities explain system reliability to policymakers and opinion shapers," said Larry C. Kinard, chairman, operating committee.

Educating utility personnel is just as important, Kinard added. The operating committee, in conjunction with the Electric Power Research Institute, recently completed a tutorial for system operators that explains how the electric system responds to disturbances.

National Energy Strategy takes shape in report

WASHINGTON—Strong appeal for energy efficiency was the loudest single message from the Department of Energy's hearings on the National Energy Strategy over the past year, said Secretary James Watkins.

The interim NES report, 230 pages, summarizes more than 1000 written statements and 12,000 pages of hearing transcripts from 15 public meetings. Comments are due July 2.

Other major points, in addition to energy efficiency, include the need for:

- Integrated resource planning.
- Enhanced energy efficiency.
- Increased use of renewables, including hydropower.
- Streamlined technology tranfers.
- Upgraded math and science training.
- Meeting environmental challenges and waste minimization, including improved nuclear power reactors.
- Developing a national energy modeling system.

Additional workshops will be held by midsummer. Interagency staffs and working groups will review the strategy in the fall, a final NES report will go the Administration in December, and the president is to release the final document by March 1991.

National Energy Strategy: Interim Report, is available by calling 202/586-6540, or writing DOE, Office of Public Inquiries, Rm. 1E-206, Mailstop PA-5, Washington, DC 20585.

ComEd tries again, requests 17.7% rate increase, $982M

CHICAGO—Commonwealth Edison Co. keeps right on asking.

The utility asked state regulators for a $982-million, 17.7-percent rate hike April 12 to help pay for three nuclear units. The filing also would stop unpopular higher summer rates, begun in 1979. The company said it would not expect to increase rates again until 1993, if this request is granted.

Financial conditions at ComEd have suffered (see p.16); other rate-hike requests to pay for the three operating units have been denied or overturned.

"We have an obligation to our customers and shareholders to bring this matter to a conclusion," said Chairman James J. O'Connor.

"Today's filing is essentially a continuation of the proceeding that began in 1986," he said.

The Illinois Commerce Commission hadn't responded to a Dec. 21, 1989, state Supreme Court rejection of a previous rate compromise package. A clarifying court order may come in June.

Rates increased $235 million in 1989, would have increased $245 million in 1990, and would have frozen through 1994. That rate package was overturned because regulators forged the compromise without the consent of dissenting parties, the court said.

The utility and regulators are unsure if the first half of the increase must be refunded, or if rates should stay as they are until another rate plan is approved.

Consumer groups want a refund. ComEd has sought a rehearing and clarification. The court was expected to issue a clarifying order in early April, but did not (*EL&P*, Feb., p.1).

ComEd unsuccessfully sought a $660-million increase in 1986.

ComEd has 12 nuclear units, the most of any U.S. utility.

SCE/SDG&E merger hearings start in CA

SAN DIEGO—Hearings on the proposed merger of San Diego Gas & Electric Co. and Southern California Edison Co. began in late April and will continue till mid-May.

In late March, SDG&E directors reaffirmed their intention to merge with SCE. The merger agreement was extended through March 1991. The merger was proposed in 1988; shareholders approved it in April 1989.

'Evergreen' provision

Tom Page, SDG&E president, chairman and CEO, said, "Although the board didn't need to vote because of an 'evergreen' provision which simply would have allowed the agreement to continue, the board wanted to affirm its strong commitment to the merger by extending the agreement to a date which should provide ample time to complete the expected regulatory approvals."

Federal regulatory hearings are underway in Washington, DC, and state hearings run in various locations April 23 through May 16.

Merger opponents are expected to present a wide range of concerns at the hearings, including doubts about the suggested amount of merger cost savings, the loss of a San Diego-based corporation, possible anti-competitive issues in the regional power market, and the impacts on the environment.

Promised benefits

The SDG&E board said the merger would:

- Increase SDG&E shareholder value.
- Save the utilities a total of $1.7 billion through the 1990s.
- Offer San Diego-area customers the more diversified generating resources of SCE.
- Delay SDG&E construction of new generating facilities.
- Take into account interests of employees, suppliers and communities served by both utilities.
- Improve San Diego's air quality.

Correction

The correct address for Powercomp International (*EL&P*, Apr. 1990, p.23) is 3208C E. Colonial Dr., Suite 195, Orlando, FL 32803.

COMMENTARY

Notes from the back of an envelope

We WILL clean the air

It now is abundantly clear that we will have a new set of Clean Air rules and regulations this year. Clean Air legislation has become so politicized that almost everyone in Congress is rushing to get his or her favorite amendment tacked onto the proposed act. Never mind that most authorities say that government estimates of costs are vastly understated. Never mind that many scientists and engineers declare that the measures specified in the proposed legislation are neither the most efficient, nor cost effective. Never mind that Congress is so hot to act that it refuses to wait another six months until its mandated 10-year, $500-million acid rain report is completed and submitted. (This is a virtual guarantee that copies of the study will quickly be relegated to dust-gathering functions in government libraries and warehouses.) Never mind that some stipulations in the Air Toxics section could shut down major industries and throw thousands of employees out of work. This is shoot-from-the-hip-and-ask-questions-later time. With all the dozens, possibly hundreds of amendments that will be tacked on to the House Energy Committee's version of the bill, floor debate may be lengthy. Reconciliation with the Senate version also will be time consuming. But there is little question that we WILL have a Clean Air Act before the end of this session of Congress. Nobody in Congress wants to miss the environmental bandwagon!

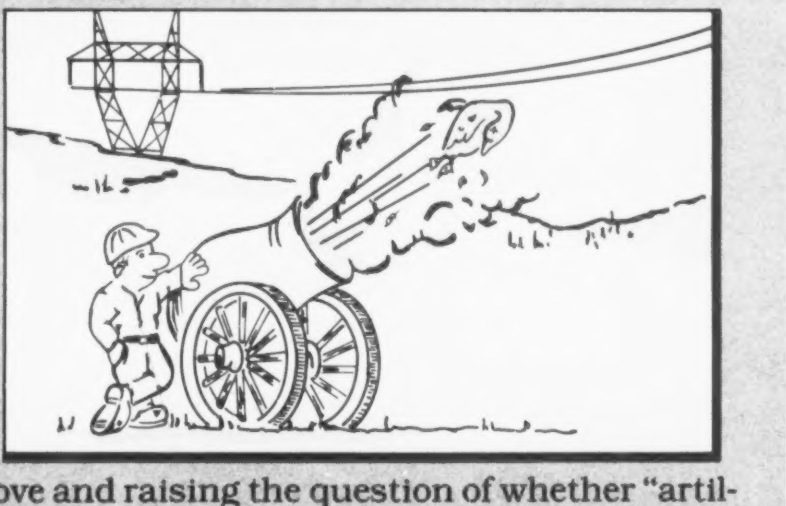
Photovoltaic efficiencies improved

Solar power has moved a step closer to becoming a potential substitute, albeit still an expensive one, for conventional generation. Scientists at Kopin Corp. in Taunton, MA, and Boeing Aerospace and Electronics in Seattle have created a solar cell that is about twice as efficient as the most advanced cells produced previously and used in our satellites. Using ultrathin layers of gallium arsenide (GaAs) and copper indium deselenide (CIS), the scientists have developed a cell that captures and converts 26 percent of the light that hits it to photovoltaic electricity, with the potential of exceeding 30 percent. While the photovoltaic efficiency level is approaching the thermal efficiency levels of many older steam units, diesel engines and gas turbines in simple cycle use, power costs are still about double what they would have to be to be cost-competitive. But the gap is narrowing...and one day, perhaps within five years, who knows....?

Big bucks for communications CEOs

It was interesting to note the compensation levels of large utility CEOs in a special *Wall Street Journal* report recently (April 18). Guess where the big bucks went? Not to electric utility CEOs. The largest annual direct compensation went to phone company execs, led by MCI's William G. McGowan ($8.6 million-plus), followed by Bell Atlantic's Raymond W. Smith ($2.5 million-plus) and eight other $1-million-plus CEOs from Baby Bells and larger independent phone companies. There were only two electric utility CEOs above $1 million—PacifiCorp's A.M. Gleason ($1.4-million plus) and SCE's Howard Allen ($1-million plus). The remaining 11 electric utility CEOs received compensations averaging $601,000. Granted, such average salaries aren't exactly peanuts, but they're a far cry from the way those "phone-guys" get paid.

Dead birds no joking matter



The story about Pacific Gas & Electric's bird strike monitor and development of a "bird cannon" to test its accuracy ("How many birds fly into your T-lines?" on p.35) may touch on the bizarre, but at PG&E, it's deadly serious work on which future transmission system expansion hinges. Nevertheless, our cartoonist couldn't contain himself, turning out the above and raising the question of whether "artilleryman" is a new utility job title?

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Iowa holding company merger expected by the end of the year

DES MOINES, IA—Two Iowa utility holding companies expect to complete their proposed merger in less than 10 months to form a new holding company, Midwest Resources Inc. Appropriate regulatory filings have begun.

Annual meetings originally scheduled in April were cancelled and were to be rescheduled for June or July to allow a shareholder vote.

Iowa Resources Inc. (Iowa Power & Light Co.) and Midwest Energy Co. (Iowa Public Service Co.) revealed merger plans on March 16 (*EL&P*, April, p.1). The agreed penalty for one of them calling off the merger plan is a $25-million payment to the other.

Merger of equals

"We have worked very hard to find the equitable way to accomplish this as a 'merger of equals,'" said Russel E. Christiansen, MWE chairman.

"Customers and shareholders will benefit from the efficiencies that can be created from the most cost-effective use of companies' facilities. The size of the new company will create more dynamic career paths for the employees of both companies," Christiansen added.

Sallie Leibhert, manager of financial operations for IR, said the reaction has generally been positive.

While the proposed transaction is expected to cost shareholders $2.6 million, Leibhert said, savings estimates have not been revealed. The operating utilities may be merged eventually, but no plans were announced. Also, no rate cuts were anticipated, although rate increases could be delayed because of combined use of generating resources, she added.

Some transaction details

MWE stockholders would receive 1.08 shares of the new company. IR stockholders would get 1.235 shares.

The new holding company board would have nine people from each utility and one jointly appointed member.

Mark W. Putney, now IR chairman, president and CEO, would become chairman and CEO of the new company. Christiansen would become vice chairman, president and COO. Additional structure changes within the utilities have not been announced.

State regulators have previously suggested that a merger of utilities would be looked on favorably. There were talks of a merger in 1985 when IR sold its gas resources to MWE.

MWE utility assets are $934 million; total assets are $1103 million; employees number 1881. IR utility assets are $1087 million, with total assets of $1204 million; employees number 1269. Additional company information is on page 16.

NU works out PSNH agreements

HARTFORD, CT—Northeast Utilities has worked out agreements on transmission and Seabrook operations with neighbor United Illuminating Co. in hopes of smoothing out the Public Service Co. of New Hampshire acquisition.

A transmission agreement was also reached with New England Power Co.(NEP), a power generating subsidiary of New England Electric System.

More than 60 intervenors have filed with the Federal Energy Regulatory Commission about the proposed acquisition. Transmission access and regional market power are two concerns area utilities have. PSNH shareholders approved the plan (*EL&P*, April, p.1).

Ongoing business on NU's $2.3-billion acquisition and PSNH's January 1988 bankruptcy filing include the following:

- Final PSNH bankruptcy court hearings were to finish by mid-April and the decision was expected in late April.
- New Hampshire state regulatory hearings began April 9 and run through May 4.
- Connecticut expected to have a management audit on the acquisition plan in late April.
- FERC hearings are expected in July and August, with a non-binding administrative law judge ruling by year's end. A final FERC decision may take until next spring.
- FERC and the Securities and Exchange Commission approved an interim NU management plan, which the bankruptcy judge was expected to approve in April.

The transmission agreements say:

- NU provides UI with three specific arrangements for transmission access across the NU system.
- UI agrees to withdraw several regulatory proceedings now pending on the proposed acquisition.
- UI agrees to recommend approval of the PSNH acquisition to the Connecticut Department of Utility Control.

NU's Connecticut Light & Power Co. surrounds UI service territory.

Under the Seabrook agreement, UI—also a Seabrook owner—has agreed to support NU as operator of the nuclear power plant. After PSNH acquisition, NU would own nearly 40 percent of the now-operating plant.

William B. Ellis, NU chairman and CEO, said "When combined with the recent progress we have made in bankruptcy court, our settlement with New England Electric and federal approvals of our interim management agreement, we have to be pleased that our proposal continues to move ahead."

Some of the provisions of the joint NEP-NU proposal before FERC are that:

- NU would provide firm transmission service for others across existing lines in New Hampshire; 400 MW for southern New England utilities, 40 MW for Vermont utilities, and 12 MW for small New Hampshire utilities.
- Capacity would be available at least 10 years and for up to 30 years if users agree to help support construction of new facilities if needed.
- NU and NEP would agree to initiate building more transmission capacity between Maine and Massachusetts, if users financially support construction and regulatory approvals are granted.

NU would continue to provide transmission service to other utilities as capacity is available.

NJ board denies opponents request

NEWARK, NJ—The Board of Public Utilities denied requests from Berkeley Township and Ocean County, NJ, to prevent Jersey Central Power & Light Co. from energizing a new 230-kV line.

Board president Scott A. Weiner stated that opponents to the line had not shown it would have harmful effect on nearby residents including those with pacemakers.

Weiner said the board would open a proceeding to consider setting a general policy on the extent to which health risks must be shown to warrant the relocation or shutdown of existing power lines or other utility facilities.

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JUNE 1990

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EL&P

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VOICE OF THE ELECTRIC UTILITY INDUSTRY

LATE NEWS

A conference committee will try to meld Senate and House bills on Clean Air. The House passed H.R.3030 on May 23; see below.

Clean Coal Technology Program's fourth call for proposals, due June 1, will be delayed. DOE said pending legislation and funding delays could lead to amending or cancelling projects worth $600M in matching funds.

PWCC rejects PacifiCorp's latest bid (below, p.4) as well as Salt River Project's May 18 bid of up to $500 million for some Arizona Public Service transmission/distribution facilities near Phoenix.

Record flooding, storms and tornados damaged utility facilities in Arkansas, Texas and Oklahoma.

An EPA draft report said electromagnetic radiation and cancer may be linked. The final report is expected this summer.

Top 100: '89 better for most utilities

BARRINGTON, IL—The nation's Top 100 investor-owned electric utilities continued their financial improvement in 1989. This sustained recovery surprised many, since 1989 was characterized by a return to more normal temperatures from 1988's superheated summer.

Although total net income for the nation's biggest electric utility companies increased almost 11 percent, per-share earnings tumbled by 11 cents per average share, down nearly 5 percent. Average residential use of electricity also fell by 53 kWh, or a bit over half a percent.

These are the quick highlights from *EL&P's* 25th annual survey of the investor-owned electric utility industry.

Revenues, which include returns from diversified operations of holding companies, and companies that function similarly to holding companies, hit an all-time high of $165.5 billion, representing a gain of 4.8 percent.

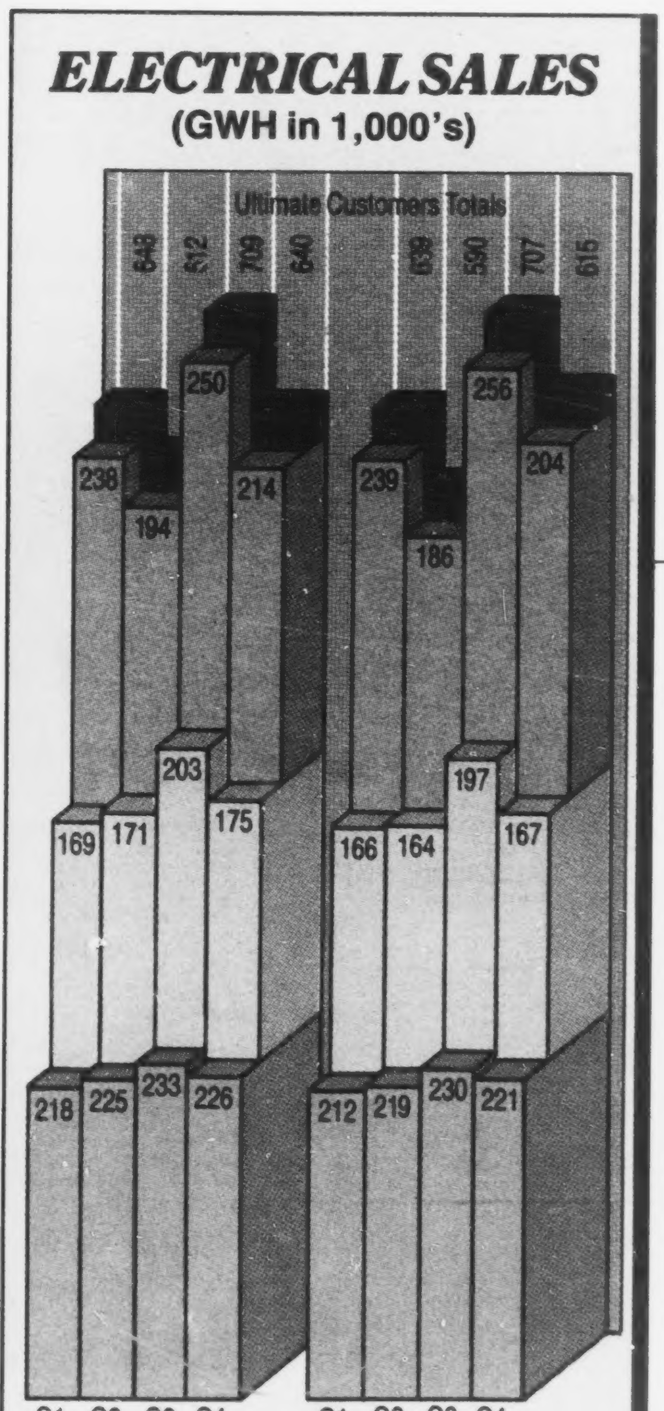
Interestingly, revenues from electric operations—the largest source of funds for most electric utilities and electric utility holding companies—grew the least, just 4.7 percent. Gas revenues grew by 5.2 percent and "other" revenues increased by 14.8 percent.

Net income from all operations increased a solid 10.8 percent in 1989, to $15.0 billion and reflected the continuing cost-control efforts of utility managements. The gain is even more impressive in light of $1.35 billion in losses suffered by just three utilities—Pinnacle West Capital Corp., Middle South Utilities (now Entergy Corp.) and Illinois Power Co.

Kilowatthour sales grew by 2.6 percent, led by commercial sales, up 5.2 percent, and "other" sales, which climbed 4.9 percent. Growth in residential sales, 1.4 percent, and industrial sales, up just 0.6 percent, lagged far behind.

Residential kWh sales growth was disappointing in that it did not even keep up with the increase in electric customers, which was up 1.7 percent.

Top 100
25th annual report starts on page 33



Source: Edison Electric Institute

New Orleans nixes NOPSI buyout

NEW ORLEANS—The city council here on May 17 voted 5-2 against proceeding with its $717-million buyout proposal of New Orleans Public Service Inc. from Entergy Corp. The vote quiets a seven-year takeover threat; rate talks apparently will follow buyout discussions.

"We will sit down with city officials and look at issues of concern," said John Cordaro, group vice president for NOPSI and LP&L. "There's a perception that rates in New Orleans are higher than they ought to be." He would not be specific about the chance of a slower phase-in of Grand Gulf nuclear plant costs, still in litigation.

Studies of the takeover economics ranged from customer savings of $798 million to added costs of $1.7 billion over 20 years. Taxable bonds would have been needed.

PacifiCorp pursues PWCC for a 4th time

PORTLAND—PacifiCorp bid a fourth time for Arizona Public Service Co. assets, offering $1.82 billion cash for the parent, Pinnacle West Capital Corp.

Analysts said PWCC would have difficulty turning away this bid. Although PWCC got rid of two hurting subsidiaries recently, it posted a large '89 loss. Including assumption of debt, the offer is about $21/share. PWCC stock jumped $3.625 on May 17, to $16.375.

The deal is also enticing for APS customers, promising just 2-percent annual rate increases for four years. If approved, the combined utility would cover eight states, add transmission access to the power-hungry California market, and delay plant construction with opposite seasonal peaks.

Utilities refigure Clean Air options; Congress debates

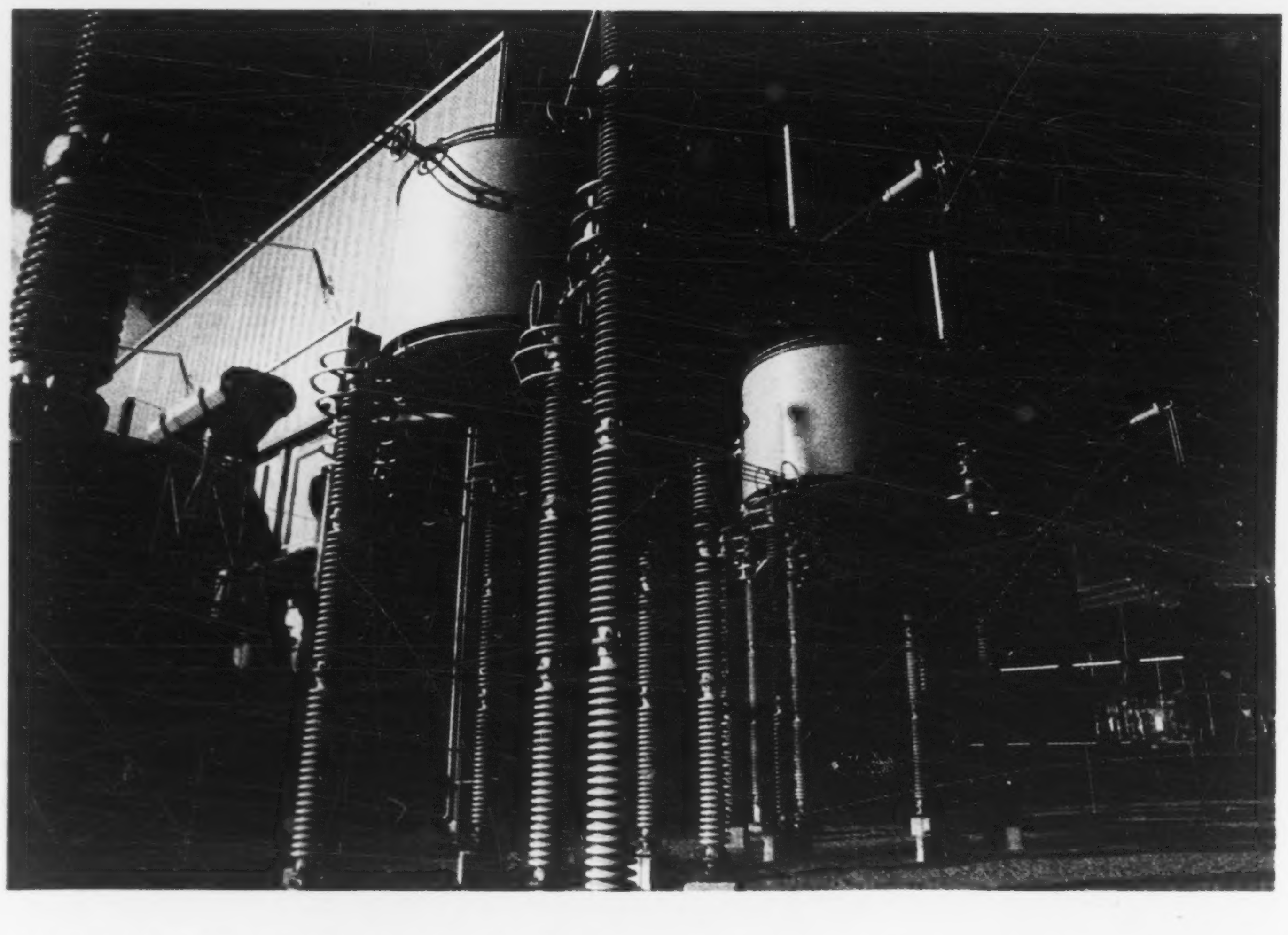
WASHINGTON—While clean air legislation takes shape in the House, the industry contemplates the Senate version and tries to prepare for whatever legislation passes.

Some in Congress contend that a compromise bill could be on President Bush's desk by September and that a House version could emerge from committee before the Memorial Day recess. After that, discussion would ensue on the House floor.

A special report outlining utilities' Clean Air options begins on page 19

A compromise on toxics partially favors industry—utility boilers will be exempt from a number of regulations, except for mercury and particulates, said Sen. John Chaffee (R-RI). Chaffee spoke at the Edison Electric Institute's May 10 Governmental Affairs Confer-

Continued on page 6



HQ-NEPOOL HVDC line is delayed

U.S. construction is completed on the $565-million Phase 2 transmission project connecting Hydro-Quebec (HQ) and New England. These 1000-MW converter transformers, which turn 450-kV dc into 345-kV ac, await further testing. The U.S. portion of the project, coordinated by New England Electric System, is on time and slightly under budget, but and HQ strike, recently resolved, may cause the project to miss its scheduled Sept. 1 start-up. Lines from HQ's Radisson substation near James Bay extends 930 miles to Sandy Pond substation, Ayer Groton, MA. It will expand capacity from 690 MW to 2000 MW.

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NEWS BRIEFS

JILL MINNER, Special Projects Editor

Nuclear storage space will fill early: IA Board

In a recent report, the Iowa Utilities Board predicted that four of the state's nuclear power plants will fill their present storage capacity for spent fuel by the year 2002, even though the plants will be able to continue operating until 2030. According to the NARUC Bulletin, the U.S. Department of Energy is planning a national storage facility, but it will probably not be opened until 2010. The board concluded that without new storage capability, utilities may need to locate new coal-fueled or natural gas-fueled power sources to replace their low-cost nuclear electric generation. "An additional concern is that coal-fired capacity is a less attractive option with anticipated clear air compliance expenses," stated Iowa Utilities Board Member Nancy Boyd. Three Iowa utilities that rely heavily on nuclear power plants are Iowa Electric Light & Power, Iowa-Illinois Gas & Electric, and Iowa Power and Light, according to the board.

U.S. nuclear output hits single-month high

According to the U.S. Council for Energy Awareness, U.S. nuclear energy plants set a single-month record for output in January 1990. The 57.7-billion gross kWh high inched past the old record of 57.6 billion gross kWh set in August 1989, said USCEA.

Fannie Mae okays SRP energy efficiency plan

The Federal National Mortgage Association (Fannie Mae) has endorsed Salt River Project's new energy efficient residential construction program. The endorsement ensures that Fannie Mae will accept the Climate Crafted Home program's energy efficiency certification process for new homes, allowing increases of two percentage points for energy efficiency. "The program has allowed buyers, who would not have otherwise qualified, to purchase homes due to the 2-percent 'stretch' allowed for a Climate Crafted Home," explained SRP Assistant General Manager C.A. Howlett. SRP said its Home Stretch Mortgage is one of the first utility-sponsored programs—for new homes—in the nation to take advantage of the energy efficient guidelines available through Fannie Mae since December 1983. "We are pleased to receive this endorsement from Fannie Mae," said Howlett. "Home Stretch Mortgage is a progressive, innovative plan which can positively impact the Valley's residential real estate and mortgage lending information," he added.

McNeill named president amid PE changes

Philadelphia Electric Co.'s new nuclear group from left to right includes: David R. Helwig, Dickinson M. Smith, Corbin A. McNeill Jr., and Donald B. Miller.

Philadelphia Electric Co. recently announced a number of executive changes including the appointment of Corbin A. McNeill, Jr. to president and chief operating officer. McNeill has served as executive vice president of nuclear operation since 1988. "Corbin McNeill has demonstrated outstanding leadership and management skills in reorganizing Philadelphia Electric's nuclear operations in addition to overseeing the successful restart of the Peach Bottom plant and the construction and licensing of the Limerick nuclear facility," stated PE Chairman and CEO Joseph F. Paquette. Other executive changes at the utility include: Dickinson M. Smith, senior vice president-nuclear; Donald B. Miller, vice president of PE's Peach Bottom station; Raymond F. Holman, senior vice president of corporate planning and performance; and David R. Helwig, vice president, nuclear engineering and services.

EPRI awards three 'product champions'

The Electric Power Research Institute recently presented its Customer Systems Division Product Champion award to three outstanding electric utility employees. John W. Calhoun Jr. of Alabama Power Co., Dale Landgren of Wisconsin Electric Power Co., and James R. Thompson of Toledo Edison Co. were recognized for their significant contributions to technology transfer of EPRI-developed products into practical utility and utility customer use. Calhoun led efforts at Alabama Power to collect data supporting a change to the National Electrical Code; Landgren helped WEPCo reach a conservation goal; and Thompson initiated a "Working Partner" marketing theme to help Toledo Edison's industrial customers in his service area become more competitive. "Taking the results of research and development to the people in the field so the customers can benefit is what tech transfer is all about," said Arnold Fickett, EPRI customer systems division vice president.

PSI changes name

Public Service Indiana's name has been changed to PSI Energy Inc., and PSI Holdings will now be known as PSI Resources Inc., according to the company. "Our new name is a reflection of the kind of business our company is in; we're evolving from simply an electric company to a low-cost supplier of energy services," stated PSI Chairman James E. Rogers Jr. "Providing a reliable supply of electricity continues to be our company's mainstay, along with the responsive service our customers have come to expect," he added.

FPL sets up nuclear division, names head

Florida Power & Light Co. said it has established a separate nuclear division and named two executives to head it. Jerome H. Goldberg, executive vice president of the utility's nuclear energy department, was appointed president of the new division. Kenneth N. Harris, site vice president of FPL's Turkey Point nuclear plant, will serve as senior vice president-nuclear operations. "The new division dedicates all of our talents exclusively toward nuclear programs," explained Goldberg. "We plan to have the new structure in place by June and ready to meet the challenges facing our industry."

EUA says acquisition complete; Powderly to head Newport Electric

Eastern Utilities Associates said it has completed its acquisition of Newport Electric Corp. from NECO Enterprises Inc. for approximately $17.9 million. "Newport Electric is a welcome addition to the EUA System," said EUA President and CEO Donald G. Pardus. "We believe EUA brings added value to Newport's customers at the same time Newport brings added value to EUA's shareholders." Pardus also announced the appointment of Robert G. Powderly as president of Newport Electric. Powderly has served as vice president of EUA Service Corp. for the past three years.

C-E Environmental is renamed due to merger

The name of C-E Environmental Inc. has been changed to ABB Environmental Services Inc., as a result of Asea Brown Boveri Inc.'s acquisition of Combustion Engineering Inc. earlier this year. "We are extremely pleased with our association with ABB," said C-E Environmental President Lawrence S. Eytel, "and with the opportunities presented for both our clients and employees by the backing of a corporation of ABB's size and stature."

Iowa-Ill. Gas & Electric picks new president

Iowa-Illinois Gas and Electric Co. has announced the appointment of Stanley Bright to president and chief operating officer. Bright, formerly vice president-finance and chief financial officer, succeeds Barry O'Brien who will remain as chairman and CEO of the utility. "These changes are part of normal management transition to prepare the company for the 1990s and beyond," explained O'Brien.

Utilities install barrier net with new design

Consumers Power Co. and Detroit Edison have installed what they say is the world's largest barrier net in Lake Michigan at the Ludington pumped storage hydroelectric facility. For its second year of operation, the net has been modified to improve effectiveness in keeping fish from the plant and to overcome previous problems. "We learned last year that the design of the net is viable and we can effectively maintain and repair it," explained Gordon L. Heins, Consumers Power senior vice president of energy supply.

Utilities fined by NRC

The U.S. Nuclear Regulatory Commission recently proposed the following fines:

Duke Power Co.

A $50,000 civil penalty at the Catawba nuclear power plant was reduced to $37,500, because of corrective action taken by the utility.

Northeast Energy Co.

A $3,750 fine for an alleged violation of NRC requirements for the safe shipment of a piece of equipment used at the Millstone Unit 1 nuclear plant.

Tennessee Valley Authority

A $240,000 fine for retaliating against three employees who brought concerns about the safety of the Watts Bar plant to the attention of the NRC.

A $75,000 fine for two violations of NRC safety requirements relating to a residual heat removal pump design deficiency at the Sequoyah nuclear power plant.

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COMMENTARY

Notes from the back of an envelope

PacifiCorp/Pinnacle West merger: Is a hostile takeover possible?

Could there be a hostile utility takeover looming on the horizon? A spokesman for PacifiCorp suggests the possibility. If it should happen, it would be the first such investor-owned utility action in memory.

For years, critics have compared the investor-owned electric utility business to a men's club, where peaceful friendship, cooperation, and harmonious open acceptance of fellow-members have been bywords. In that atmosphere, such an acrimonious suggestion would have been unthinkable, which serves to show how much things have changed since the concepts of competition and diversification were extended to electric utilities.

PacifiCorp has been rebuffed in its fourth effort to merge Pinnacle West Capital Corp., the unfortunate, diversified parent of Arizona Public Service Co. Pinnacle West directors turned down PacifiCorp's $1.82-billion takeover bid, as well as a late offer by Salt River Project to buy part of APS' territory.

Pinnacle West has been a classic example of why shoemakers are advised to stick to their lasts, and utilities to the job of making and distributing electricity. Diversification has proved to be disastrous for Pinnacle West.

But now, Pinnacle West says it has put its unsuccessful savings and loan venture behind it. Regulators relieved the holding company from further responsibility for MeraBank in March after the company had provided a $465-million capital infusion to the troubled thrift. It has found a buyer for its unprofitable uranium mining operation.

Pinnacle West directors and financial advisors apparently believe that with *only* a $1.1-billion debt, and the potential of getting the Palo Verde nuclear plant back into service soon, PacifiCorp's $21 per-share offer isn't enough. Although share price was just $15.75 on the Big Board before the mid-May offer, Pinnacle West chairman Richard Snell called the PacifiCorp bid inadequate. He declared that the company now has a direction for recovery that it will follow and that the company's equity and intrinsic value will appreciate substantially by the time regulatory approvals could be obtained and shareholders paid money due them.

The question remains: what now? PacifiCorp has suggested that one of several options open to it would be to approach shareholders directly in a hostile tender offer. But it is hoping for a more harmonious solution. Nevertheless, PacifiCorp is deadly serious in wanting APS in order to balance long-term capacity needs and further open lucrative California markets.

Financial analysts call PacifiCorp's offer difficult to resist. The question may be how long Pinnacle West management can hold out. In other words, it may be more a matter of *when*, not *if*, Pinnacle West and APS become members of the PacificCorp family.

Confusion about the role of the press?

Just when you begin to think people in the industry know what you're doing, you get tripped up from your blind side. Recently an *EL&P* editor made contact with the head of public relations of a national industry association to arrange for our coverage of the association's convention. This person lumped *EL&P* in with equipment vendors in having a direct proprietary interest in being at the conference. This occurence is not an isolated happening. It seems to result from time-to-time from internal pressures to control costs (evidently for meals, receptions and the like), often coupled with selection of inexperienced people to provide media relations services. Such people seem to believe they are doing *EL&P*, and other trade publications, a favor by allowing free coverage of their meetings. Some, usually with association publications to protect, also prohibit the appearance or distribution of other publications at or near the meeting site.

It's unfortunate that such people try to limit press coverage. In preventing unrestricted reporting of their meetings, they do a disservice to their own members, as well as to industry associates, regulators and others who have no other opportunity to learn of those associations' activities.

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LETTERS

Childcare's role

Having just finished the "Labor/Management Concerns" feature of the March issue, I feel compelled to express my pleasure in its focus. In the 12 years I have been in the utility business (and an avid reader of *EL&P*), it is refreshing to read a piece that acknowledges the importance of childcare for workers in the utility industry.

While not a singularly feminine concern, childcare is important to any parent who has to work for a living. When I started in the business, I was one of a handful of women engineers. Many of my coworkers simply assumed that I would work until I had a baby. There were very limited childcare (and maternity leave) options.

In a male-dominated industry such as ours it is heartening to read an article that focuses on a subject perceived to be a "women's issue." Utility management must wake up to this very important problem and not continue to bury its head in the sand hoping that it will just go away. With a growing awareness of the employees' need for childcare, the industry may increase its attraction to women, a very significant part of the workforce of tomorrow.

Kudos!!

Maria Zazzera
Milltown, NJ

Editor's note: Women have always played a role in the operation of utility organizations. Happily that role has grown in recent years as more and more women have moved into jobs long considered to be the province of men, including engineering, law, finance, management, operations, construction and maintenance. Awareness of the need for childcare is an evolutionary development, albeit not yet universally available in the industry, that will benefit both men and women employees.

Research & Development

In 1963, *EL&P* devoted an entire special issue to the question of "who's to do the R&D?" An editorial by P.B. Garrett in your July 1965 issue also addressed this question.

In light of the changed and changing environment in which electric utilities now operate, relative to 10, 20 and 30 years ago, it seems that this question is more relevant now than ever before.

Deregulation, Independent Power Producers, new clean-air regulations, energy conservation, projected fossil-fuel shortages, competition, etc. etc., are complicating the utility industry future now as never before.

Have you considered doing an update on the September 1963 article and on the question of what utility R&D should focus on specifically?

Norman L. Ledeboer
Supervising Research Engineer
Northern States Power Co.

Editor's note: It's always nice to hear from a "seasoned" reader who, like this editor, recalls those pre-EPRI days. (I worked on that issue.) No, we haven't specifically planned to update that issue since R&D currently plays such a large role in day-to-day industry activities, but we do emphasize certain segments of R&D (such as the April '90 Focus Report on T&D R&D). Your suggestion, in light of the changing operational and regulatory environment, merits serious thought.

Identify illustrations better

I read your "Focus on Wheeling and Access" article regarding transmission system limits in the March 1990 issue of *Electric Light & Power* with interest. It presents a complex technical subject in a concise, understandable manner.

I would like to suggest that in future articles containing tables and graphs that are referred to in the text, those tables and graphs be labeled the same as in the text. Because your figures are not labeled, your article is not as easy to read as it could be. This is a drawback in using the article as information to explain this subject to those that do not understand all the background and detail and do not wish to take the time to label the figures themselves.

Thank you for your concise summary of this subject matter.

William E. MacMillan, Staff Engineer
Power Resources and System
Planning Dept.
Consumers Power Company

Editor's note: Your point is well-taken. We'll try to do a better job in coming issues. Please let us know how you think we're doing.

Mystery substation

Working for a utility as an electrician, I find your publication interesting and resourceful. In your March 1990 an announcement on page 30 with a picture of a substation has caused much debate among my co-workers over the location of that substation. It looks like one of the subs in our jurisdiction. Would you please identify the owners' name and city, or at least the city? Enclosed is a copy of the picture.

Steven Suess
Santa Clara, CA

Editor's note: You caught us! The substation photo that reader Suess refers to came from our photo file, but there was no identification. We'd be grateful for help in identifying it.

Clean Air proposal

After having read and reflected upon the (March 1990) Commentary entitled "Single industry proposal offers economic air cleanup," I feel compelled to address the same issue but from a different and, perhaps, from a more insightful point of view. The writer of the commentary makes three significant but very narrow-minded implications: a) the U.S. Congress knows little or nothing about air pollution abatement; b) among the readership of *EL&P* are all of the "experts" in this field; and c) the $600-million National Acid Precipitation Assessment Program will answer all of our questions (and, of course, Congress' as well) about this subject.

It seems quite clear that the writer of the commentary holds his readership in very high esteem in regards to knowledge about air pollution controls and systems. Perhaps, however, he believes that the many environmental scientists and engineers whose sole purpose is to study the long-term impact of air emission point sources on the environment are among the readership? Maybe, but rather unlikely.

Perhaps the meteorological laboratories at various universities that continuously monitor air quality from stations located throughout the world and from space using highly sophisticated instrumentation and satellites have

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25th Annual Top 100 Electric Utilities Report

Recovery continues, but performance totals mask individual problems

Robert A. Lincicome
Editor-in-Chief

BARRINGTON, IL—For the nation's 100 largest electric utility organizations, 1989 picked up where 1988 left off. More normal weather returned to most of the country, but kilowatthour sales still increased, pushing revenues generally higher. Net income for the Top 100 also improved over 1988.

Also on the plus side, a majority of the Top 100 electric utilities reduced their long-term debt in 1989. And more than a third improved their interest coverage.

But the number of utilities finishing the year in the red more than doubled, to 10 companies in 1989. Moreover, 41 utilities reported reductions in earnings for 1989 from a year ago.

Kilowatthour sales increased by 2.62 percent overall, but residential sales slowed. And average residential use declined slightly.

These were some of the principal conclusions from this year's survey of major investor-owned electric utility financial and sales performance in calendar year 1989.

While much of the survey specifically focuses on utility operations, financial data is obtained and reported for the utility or its holding company parent, depending on the name in which stock is traded on the financial market. According to the survey, 36 companies trade stock as holding companies and are indicated in the following tables with an asterisk (*). Some companies, such as Utilicorp and PacifiCorp, are diversified and function similarly to holding companies but retain their individual utility status.

Actually, the totals reported are understated slightly because they reflect only the results of 99 companies. Public Service Co. of New Hampshire stated that its situation was too fluid to report. PSNH said it was swamped with work associated with completion of the Seabrook nuclear plant, the company's emergence from Chapter 11 bankruptcy protection, and its takeover by Northeast Utilities, and could not report accurately.

Total electric customers served by the Top 100 utilities increased by 1.7 percent in 1989, to 82 million. Gas customers served by combination utilities also increased, by 1.2 percent, in 1989, to a total of 18.1 million.

Nevada Power Co. boasted the greatest customer growth, a huge 10.1 percent gain. Other big gainers, with one exception, were from the South and West, reflecting the general shift of population away from the Northeast and Midwest. Central Maine Power Co., up 5.2 percent, was the exception. Following were Puget Sound Power & Light Co., plus 3.76 percent; Florida Progress Corp. (Florida Power Corp.) 3.72 percent; San Diego Gas & Electric Co., 3.59 percent; Sierra Pacific Power Co., 3.48 percent and FPL Group (Florida Power & Light Co.), 3.46.

Slow sales increase

Kilowatthour sales increased in 1989 at a slower rate than in the previous several years. The increase in 1989 was 2.62 percent, to 2,227,899 GWh.

That growth marked a return to the more typical activity levels that followed the Oil Embargo and ran through the mid-1980s. The 1988 sales increase was 5.3 percent, a post-Embargo high.

Even so, the 1989 total was another all-time record.

More normal temperatures returned in 1989. Although there were isolated hot spots during the summer of '89, they didn't begin to compare with the degree or duration of the summer of '88. Exceptional cold in December for much of the country added a kWh sales boost late in the year, although some utilities incurred related expenses in 1989 and recorded the revenue in 1990.

The slower growth is easiest seen when broken down by type of customer. Residential sales inched ahead just 1.4 percent, to 651,100 GWh. Since customer growth was 1.7 percent, and since most of customer growth was residential, it is clear that residential use lagged.

Industrial kWh sales also barely made a positive gain, moving up just 0.6 percent, to 680,196 GWh. This reflected the generally meandering changes in output and economic activity of American industry.

Sales to commercial customers and those falling into the "other" classification provided the only solid growth in 1989. Commercial customers used 5.2 percent more kWh in '89 than a year earlier, pushing total sales to those customers to 586,852 GWh and reflecting the continuing switch away from a producer economy and to a consumer- and service-oriented economy.

Sales to "other" customers increased 4.9 percent, to 309,762 GWh. This includes sales to other utilities and to municipal and other special customers.

EARNINGS TABLE

Company	Rank	% Change From 1988	1989 Earnings Per Share, $	1988 Earnings Per Share, $
Centel*	1	259.86	5.11	1.42
Carolina Power & Light	2	105.88	4.20	2.04
Idaho Power	3	79.55	2.27	1.32
Ohio Edison	4	78.69	2.18	1.22
Interstate Power	5	29.38	2.73	2.11
Iowa Resources*	6	27.52	1.90	1.49
Public Service of Indiana	7	26.09	2.32	1.84
Midwest Energy*	8	24.59	2.28	1.83
Minnesota Power	9	23.40	2.90	2.35
Public Service of Colorado	10	21.03	2.59	2.14
Kentucky Utilities	11	19.59	2.32	1.94
Commonwealth Energy System*	12	18.29	4.14	3.50
Entech*	13	16.00	0.87	0.75
CMS Energy*	14	14.80	3.80	3.31
Iowa Southern*	15	11.29	3.55	3.19
Texas Utilities*	16	11.00	4.44	4.00
TECO Energy*	17	10.80	2.36	2.13
Duquesne Light	18	9.14	2.03	1.86
DPL*	19	8.64	3.27	3.01
Pennsylvania Power & Light	20	8.58	4.05	3.73
Cilcorp*	21	8.16	3.58	3.31
Washington Water Power*	22	6.30	2.70	2.54
Delmarva Power & Light	23	5.88	1.80	1.70
Hawaiian Electric*	24	5.52	3.06	2.90
Wisconsin Energy*	25	5.49	2.88	2.73
General Public Utilities*	26	5.47	5.01	4.75
Central Maine Power	27	4.92	1.92	1.83
St Joseph Light & Power	28	4.70	2.45	2.34
Duke Power	29	4.48	5.13	4.91
MDU Resources Group	30	4.42	1.89	1.81
Pacificorp	31	4.34	3.61	3.46
Florida Progress* (FPC)	32	4.26	3.67	3.52
Northern States Power	33	4.18	3.24	3.11
Sierra Pacific Power	34	3.54	2.05	1.98
Eastern Utilities Associates*	35	3.51	2.95	2.85
Kansas City Power & Light	36	3.44	3.31	3.20
Utilicorp United	37	3.03	2.04	1.98
SCEcorp*	38	2.01	3.56	3.49
Union Electric	39	1.95	2.61	2.56
Public Service Enterprise Group*	40	1.95	2.62	2.57
Nevada Power	41	1.69	1.81	1.78
Atlantic Energy*	42	1.63	3.74	3.68
SCANA Corporation* (SCE&G)	43	1.33	3.04	3.00
Philadelphia Electric	44	1.29	2.36	2.33
Consolidated Edison	45	1.22	2.49	2.46
Otter Tail Power	46	1.04	1.94	1.92
Potomac Electric Power	47	0.93	2.16	2.14
Cincinnati Gas & Electric	48	0.46	4.34	4.32
Central Vermont Public Service	49	0.39	2.59	2.58
American Electric Power*	50	0.31	3.25	3.24
Iowa-Illinois Gas & Electric	51	0.24	4.21	4.20
Southern Company*	52	0.00	2.68	2.68
Houston Industries*	53	−0.60	3.32	3.34
San Diego Gas & Electric	54	−0.94	3.15	3.18
Central Louisiana Electric	55	−1.11	3.55	3.59
Orange & Rockland Utilities	56	−1.26	3.14	3.18
Southwestern Public Service	57	−2.00	2.45	2.50
Madison Gas & Electric	58	−2.01	2.92	2.98
Green Mountain Power	59	−2.07	2.36	2.41
Empire District Electric	60	−3.61	2.94	3.05
IPALCO Enterprises*	61	−3.79	2.54	2.64
Oklahoma Gas & Electric	62	−4.69	3.05	3.20
IE Industries*	63	−4.94	2.31	2.43
Southern Indiana Gas & Electric	64	−5.07	2.81	2.96
Central & South West*	65	−5.25	3.25	3.43
Commonwealth Edison	66	−5.98	2.83	3.01
Allegheny Power System*	67	−6.06	3.72	3.96
Rochester Gas & Electric	68	−6.67	2.10	2.25
Dominion Resources*	69	−8.41	4.14	4.52
FPL Group* (FP&L)	70	−8.77	3.12	3.42
KPL Gas Service	71	−8.89	2.05	2.25
New York State Electric & Gas	72	−9.96	2.53	2.81
Northeast Utilities*	73	−10.70	1.92	2.15
Wisconsin Power & Light	74	−11.47	1.93	2.18
Baltimore Gas & Electric	75	−12.10	3.05	3.47
Puget Sound Power & Light	76	−12.15	1.88	2.14
Wisconsin Public Service	77	−13.16	1.98	2.28
Central Hudson Gas & Electric	78	−13.31	2.28	2.63
Louisville Gas & Electric	79	−13.51	3.20	3.70
Central Illinois Public Service	80	−18.72	1.91	2.35
Northern Indiana Public Service	81	−29.08	1.00	1.41
Kansas Gas & Electric	82	−35.24	1.36	2.10
Niagara Mohawk Power	83	−35.54	0.78	1.21
TNP Enterprises* (Tex−NM Power)	84	−63.39	1.90	5.19
Portland General*	85	−127.49	−0.58	2.11
Boston Edison	86	−147.31	−0.88	1.86
Tucson Electric Power	87	−171.72	−3.55	4.95
Middle South Utilities*	88	−214.93	−2.31	2.01
United Illuminating	89	−221.03	−5.87	4.85
Illinois Power	90	−302.80	−4.34	2.14
Gulf States Utilities	91	−370.27	−1.00	0.37
El Paso Electric	92	−1057.14	−3.35	0.35
Pinnacle West Capital*	93	−12820.00	−6.36	0.05
Public Service of New Mexico	94	NA	1.73	−5.78
Long Island Lighting	95	NA	−1.51	−10.08
New England Electric*	96	NA	2.36	−0.94
Centerior Energy*	97	NA	1.90	−0.53
Pacific Gas & Electric	98	NA	1.90	−0.10
Detroit Edison	99	NA	2.65	−2.92
Public Service of New Hampshire	100	NA	NA	NA

SALES DATA

Company	1989 Total Sales (KWH)			1989 Sales (KWH) By Type of Customer (% of Sales)				Average Annual Residential Use		Ratio of Long-Term Debt to Net Plant	
	Rank	% Increase	Average Annual Growth 1984 - 1988	Resid.	Comm.	Indus.	Other	1989	1988	1989	1988
Midwest Energy*	1	23.17	4.71	21.16	17.28	19.63	41.92	7,693	7,870	41.88	41.29
Idaho Power	2	17.75	-4.59	24.97	14.39	28.06	32.58	14,923	14,364	38.03	39.16
Green Mountain Power	3	14.56	6.81	23.74	23.30	20.38	32.58	9,049	9,011	44.07	36.26
Sierra Pacific Power	4	12.86	3.26	27.81	35.64	33.41	3.14	7,449	7,445	41.09	41.37
American Electric Power*	5	12.18	-1.82	22.19	15.56	33.55	28.70	10,953	10,962	47.55	49.63
Puget Sound Power & Light	6	10.90	1.58	44.86	28.62	18.11	8.41	13,430	13,213	55.50	56.85
Kansas Gas & Electric	7	10.79	0.37	23.53	19.55	33.30	23.62	9,248	9,726	38.75	40.71
Entech*	8	9.47	4.20	18.64	19.35	28.31	33.70	9,057	8,482	46.03	46.74
Nevada Power	9	7.96	5.12	43.16	19.90	30.97	5.97	13,624	13,771	53.17	52.49
Central Hudson Gas & Electric	10	7.82	-0.89	26.83	25.03	31.95	16.20	7,011	7,059	54.51	54.72
Louisville Gas & Electric	11	7.80	2.64	29.49	25.74	27.20	17.58	10,182	10,467	37.18	35.00
Washington Water Power*	12	7.14	0.63	29.47	20.62	13.12	36.79	13,531	13,284	53.04	53.66
FPL Group* (FP&L)	13	7.10	4.27	50.37	40.05	6.55	3.04	11,895	11,490	36.79	36.62
Southwestern Public Service	14	6.38	3.00	12.58	13.25	37.02	37.15	7,934	7,924	40.00	40.06
El Paso Electric	15	6.38	7.36	22.13	24.70	13.00	40.17	6,124	6,025	52.64	45.93
Delmarva Power & Light	16	5.91	4.61	28.16	26.56	27.94	17.34	9,639	9,575	41.72	40.60
New York State Electric & Gas	17	5.06	3.08	29.88	18.16	18.33	33.64	7,786	7,791	52.47	53.99
Dominion Resources*	18	5.06	5.47	35.97	29.57	16.29	18.17	13,109	13,006	46.81	46.21
Iowa Southern*	19	5.06	5.26	33.81	16.85	40.66	8.69	8,539	8,855	36.65	37.85
Boston Edison	20	4.89	2.34	24.82	51.59	13.42	10.17	6,160	6,270	42.70	46.53
Allegheny Power System*	21	4.64	6.07	18.67	10.96	27.46	42.91	9,950	9,850	40.32	41.60
San Diego Gas & Electric	22	4.63	4.79	35.64	36.67	20.22	7.47	5,447	5,420	37.72	40.64
Southern Company*	23	4.60	2.44	23.11	20.79	32.89	23.21	11,287	11,255	43.40	43.45
Portland General*	24	4.34	2.29	34.43	28.74	19.61	17.23	12,568	12,343	45.49	47.83
Cincinnati Gas & Electric	25	4.27	3.36	34.15	25.53	27.69	12.63	11,058	11,190	42.07	42.96
Wisconsin Power & Light	26	4.09	1.48	26.38	15.12	32.49	26.00	8,655	8,684	35.50	37.81
TECO Energy*	27	3.78	1.25	40.43	31.50	20.72	7.35	13,258	12,943	32.44	32.69
Atlantic Energy*	28	3.64	4.28	42.87	38.29	18.13	0.71	8,382	8,460	47.89	41.10
Public Service of Indiana	29	3.59	1.52	27.83	22.83	34.06	15.28	11,314	11,356	37.54	44.55
Hawaiian Electric*	30	3.58	3.25	28.00	26.00	46.00	0.00	7,318	7,195	31.89	32.40
Consolidated Edison	31	3.45	2.98	27.76	67.01	3.72	1.51	3,884	3,892	38.12	36.32
Orange & Rockland Utilities	32	3.40	0.87	33.24	22.96	31.07	12.72	6,922	7,079	40.20	41.44
Baltimore Gas & Electric	33	3.38	4.93	38.12	9.93	51.95	0.00	10,438	10,362	41.27	39.76
Potomac Electric Power	34	3.35	4.04	25.85	42.36	21.47	10.32	10,719	10,812	39.94	41.18
Pacificorp	35	3.04	17.89	22.57	19.51	38.54	19.39	10,209	10,070	45.20	44.88
New England Electric*	36	3.00	2.76	36.88	34.97	23.88	4.27	7,089	7,077	53.32	53.87
Central Louisiana Electric	37	2.98	2.50	39.79	17.85	34.59	7.78	12,526	12,164	31.44	37.30
SCANA Corporation* (SCE&G)	38	2.96	2.97	32.37	27.81	30.95	8.87	12,891	12,805	41.07	37.14
Rochester Gas & Electric	39	2.87	0.51	27.41	24.25	25.22	23.12	7,101	7,124	49.45	52.51
St Joseph Light & Power	40	2.72	3.63	38.20	29.35	31.45	1.00	9,615	9,835	33.37	36.91
MDU Resources Group	41	2.72	1.78	33.92	16.03	32.42	17.63	7,876	7,926	47.03	48.17
Public Service of Colorado	42	2.72	2.57	27.46	49.66	17.05	5.83	6,348	6,403	36.63	38.66
Carolina Power & Light	43	2.68	3.44	25.76	19.12	31.98	23.14	12,419	12,571	37.81	40.17
Pennsylvania Power & Light	44	2.68	7.57	29.02	23.90	25.16	21.93	10,064	10,059	39.05	38.80
Pacific Gas & Electric	45	2.19	2.81	35.81	38.76	25.43	0.00	6,468	6,537	48.89	50.22
Public Service Enterprise Group*	46	2.16	3.09	26.70	45.47	26.53	1.31	6,221	6,271	37.75	38.31
Long Island Lighting	47	2.00	3.54	42.04	51.40	0.00	6.57	7,932	7,904	162.93	49.31
Utilicorp United	48	1.99	23.36	39.32	22.79	17.56	20.33	10,385	10,364	45.14	45.67
Northeast Utilities*	49	1.97	2.80	38.54	35.18	22.33	3.95	8,460	8,418	49.40	50.75
SCEcorp*	50	1.84	1.45	30.89	34.04	32.15	2.92	6,217	6,264	46.35	46.91
Central Maine Power	51	1.83	3.41	34.61	24.94	38.71	1.74	7,384	7,358	45.38	56.58
Oklahoma Gas & Electric	52	1.53	-1.32	30.74	22.11	28.90	18.25	10,916	11,194	38.74	39.28
Central & South West*	53	1.51	-0.22	29.60	24.88	31.50	14.02	10,908	10,814	35.30	35.16
Texas Utilities*	54	1.51	3.36	33.20	29.09	27.05	10.66	13,747	13,498	40.13	43.86
Florida Progress* (FPC)	55	1.45	5.37	44.46	26.37	14.21	14.97	12,059	11,754	33.19	27.98
Northern Indiana Public Service	56	1.42	0.43	17.66	18.81	61.08	2.45	6,854	7,286	39.91	41.16
Middle South Utilities*	57	1.37	1.92	29.30	21.29	38.05	11.37	11,639	11,671	54.47	55.69
Philadelphia Electric	58	1.35	3.03	30.52	15.06	51.26	3.16	7,655	7,807	52.42	50.50
Wisconsin Public Service	59	1.32	3.67	23.84	24.60	30.22	21.33	7,450	7,616	37.64	38.35
TNP Enterprises* (Tex-NM Power)	60	1.28	-0.17	30.84	21.95	45.01	2.20	11,236	11,236	37.14	32.63
CMS Energy*	61	1.27	1.76	31.79	27.26	37.21	3.74	7,361	7,361	85.14	87.02
Eastern Utilities Associates*	62	1.27	2.83	34.02	35.97	19.99	10.02	6,226	6,277	52.57	54.78
Houston Industries*	63	1.20	-0.88	27.16	20.37	49.64	2.83	13,271	13,163	42.05	36.89
Cilcorp*	64	1.19	2.22	30.53	23.78	44.72	0.98	9,206	9,479	34.49	36.36
Niagara Mohawk Power	65	1.15	-1.13	29.26	32.30	34.42	4.02	7,700	7,626	57.04	52.85
Interstate Power	66	1.08	NA	21.85	17.10	54.89	6.15	7,632	7,872	43.38	43.64
Wisconsin Energy*	67	1.01	5.84	25.06	23.79	39.05	12.10	7,691	7,925	52.77	54.10
Gulf States Utilities	68	0.99	-2.84	23.57	18.92	44.90	12.61	13,228	13,029	46.94	49.83
Commonwealth Edison	69	0.93	2.60	26.52	29.89	30.01	13.57	6,647	7,160	37.34	36.92
Illinois Power	70	0.72	0.34	27.04	18.70	48.31	5.95	8,755	9,088	52.98	47.04
Central Illinois Public Service	71	0.70	-2.76	32.34	12.90	48.37	6.39	9,193	9,453	38.91	38.71
Duke Power	72	0.65	4.34	25.36	21.32	38.92	14.40	12,459	12,614	35.53	36.88
Commonwealth Energy System*	73	0.58	3.73	25.37	27.12	6.60	40.92	6,591	6,843	37.46	26.53
Central Vermont Public Service	74	0.50	5.18	30.08	25.70	12.51	31.71	8,066	8,108	42.83	42.42
Madison Gas & Electric	75	0.46	1.55	27.98	55.65	6.75	9.62	6,474	6,768	43.28	44.73
Union Electric	76	0.41	2.41	32.26	33.64	28.54	5.56	10,289	10,645	41.32	42.65
United Illuminating	77	0.28	2.25	35.49	42.47	20.90	1.14	6,814	6,804	63.30	56.36
Minnesota Power	78	0.16	2.11	8.75	8.53	72.40	10.32	8,297	8,156	51.75	53.92
General Public Utilities*	79	0.15	2.96	34.83	29.78	32.25	3.14	8,260	8,322	36.26	34.93
Kansas City Power & Light	80	-0.01	3.21	30.97	45.98	21.16	1.88	8,877	9,259	39.54	42.59
KPL Gas Service	81	-0.04	1.52	22.94	28.72	19.65	28.69	8,618	8,916	33.62	35.50
Northern States Power	82	-0.14	4.27	25.57	14.52	44.04	15.87	7,779	8,094	32.41	33.06
Iowa Resources*	83	-0.90	3.44	36.09	27.43	33.94	2.54	8,832	9,150	46.26	48.48
Detroit Edison	84	-0.91	2.83	28.39	21.07	46.23	4.30	6,668	6,866	55.38	51.04
Centel*	85	-1.27	-1.00	29.36	31.55	22.84	16.26	6,848	7,057	NA	NA
Pinnacle West Capital*	86	-1.53	5.13	32.44	34.45	17.77	15.34	11,077	10,945	44.62	43.87
Centerior Energy*	87	-1.84	2.64	24.68	24.76	45.39	5.17	7,295	7,462	42.43	42.08
Iowa-Illinois Gas & Electric	88	-2.13	1.95	25.86	28.05	43.17	2.91	6,696	7,192	40.75	40.81
Southern Indiana Gas & Electric	89	-2.19	3.68	20.77	17.95	34.10	27.17	11,199	11,669	42.92	40.79
Public Service of New Mexico	90	-2.28	NA	19.07	27.52	12.01	41.40	5,992	5,970	41.50	52.03
Tucson Electric Power	91	-4.52	9.04	27.90	16.38	34.69	21.04	8,879	8,646	60.36	61.73
Duquesne Light	92	-4.60	2.89	22.70	37.45	23.44	16.41	6,060	6,168	50.42	50.56
IE Industries*	93	-4.63	2.37	32.88	27.95	30.29	8.88	8,329	8,608	38.06	39.22
IPALCO Enterprises*	94	-5.80	4.65	31.87	21.32	46.03	0.77	10,668	11,010	37.45	39.22
Kentucky Utilities	95	-6.33	5.77	31.16	21.99	20.18	26.67	11,923	11,925	34.77	34.59
Otter Tail Power	96	-6.60	1.03	29.45	15.71	38.19	16.64	10,239	10,183	29.42	29.90
DPL*	97	-7.20	5.27	34.34	21.59	29.99	14.08	10,763	10,858	47.05	52.49
Ohio Edison	98	-10.67	6.67	23.90	19.55	30.73	25.82	8,336	8,425	50.54	53.05
Empire District Electric	99	-13.61	4.81	32.22	24.41	20.20	23.16	10,399	10,573	40.51	39.44
Public Service of New Hampshire	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE I
THE TOP 10 IN KWH SALES

Rank '89	Rank '88	Company	KWH Sales (billions)	'89% Change
1	1	Southern Company*	136.9	4.60
2	2	American Electric Power*	117.5	12.18
3	3	Texas Utilities*	81.9	1.51
4	4	Commonwealth Edison	72.2	0.93
5	6	SCEcorp*	69.1	1.84
6	7	Duke Power	66.6	0.65
7	8	FPL Group* (FP&L)	64.1	7.10
8	5	Pacific Gas & Electric	63.8	2.19
9	11	Allegheny Power System*	59.1	4.64
10	9	Middle South Utilities*	58.9	1.37

Overall, 79 of the 99 utilities reporting enjoyed sales increases. This was down from 99 utilities of 100 last year and 84 of 100 in 1988. Only 16 utilities bettered the 5.3-percent *average* reported a year ago.

Largest gain was reported by Midwest Energy, which boasted a gain of almost 23.2 percent. Runnerup was Idaho Power Co., which saw a rebound of bulk power sales to other utilities and gained 17.8 percent. Green Mountain Power Co. recorded the third best sales gain, at 14.6 percent.

Median sales growth was 1.84 percent in 1989. This compares with 5.5 percent in 1988. The 1989 median was the first since 1986 that failed to show an increase over the previous year. In fact, the median growth in '89 was below that of 1986, which was 1.9 percent.

The largest sellers of electricity were largely the same as reported a year ago, but there were some changes in ranking. The Southern Co. and American Electric Power Co. Inc., Texas Utilities Co. and Commonwealth Edison Co., ranked first through fourth, respectively, repeated from last year. Pacific Gas & Electric fell to eighth, making way for SCECorp, Duke and FPL Group to move up one position, to fifth, sixth and seventh. Allegheny Power System moved into the Top 10 kWh sellers ninth from eleventh a year ago, displacing Middle South Utilities (now Entergy Corp.), which fell to 10th.

AEP's gain, 12.2 percent, was also large enough for it to rank the company fifth in terms of growth rate.

With residential customer use increasing at less than the rate of increase in customers, it was not surprising that average residential use declined in 1989. For 1988, average residential use totalled 9190 kWh, down 2.2 percent from the record 9358 posted by the Top 100 last year, but still above the previous high of 8928 established in 1987.

Highest residential uses were reported in the Northwest, where power tends to be very low in price and many residents are all-electric, and in the west, Southeast and Texas, where summer temperatures tend to set meters spinning. Idaho Power Co., with average residential use (ARU) of 14,923 kWh, ranked first. Second was Puget Sound Power & Light Co., 13,440 kWh. Third was Nevada Power Co., at 13,624 kWh. Rounding out the Top 10 were 4) Washington Water Power Co., 13,551 kWh; 5) Dominion Resources (Virginia Power Co.), 13,109 kWh; 6) TECO Energy (Tampa Electric Co.), 13,258 kWh; 7) Texas Utilities, 13,747 kWh; 8) Houston Industries (Houston Lighting & Power Co.), 13,271 kWh; 9) Gulf States Utilities Co., 13,228 kWh; and 10) SCANA Corp. (South Carolina Electric & Gas Co.), 12,891. All 10 were among

TABLE II
THE TOP 10 TOTAL REVENUES

Rank '89	Rank '88	Company	'89 $ Revenues (millions)	'89% Change
1	1	Pacific Gas & Electric	8,588	12.33
2	2	Southern Company*	7,492	3.55
3	3	SCEcorp*	6,904	10.42
4	4	FPL Group* (FP&L)	6,197	5.88
5	5	Commonwealth Edison	5,751	2.45
6	6	Consolidated Edison	5,550	8.65
7	7	American Electric Power*	5,140	6.19
8	8	Public Service Enterprise Group*	4,804	9.33
9	9	Texas Utilities*	4,320	4.02
10	10	Houston Industries*	3,789	3.84

the Top 10 last year, but in slightly different order.

Revenues increased

Total revenues for the Top 100 Electric Utilities increased in 1989 by 4.8 percent, to $165.5 billion. The 4.8-percent increase was the same as a year ago. Total revenues recorded for 1988 were $158 billion.

As mentioned earlier, the total was a new industry record. The previous record was established in 1988. Total revenues include the proceeds from all activities of both holding companies and electric utilities.

While revenues from electric operations represented the largest portion of total revenues, they grew the least in 1989. Electric revenues gained 4.7 percent in 1989. Revenues from gas operations increased by 5.2 percent and those from "other" operations jumped by 14.8 percent.

Rate increases again played a large role in the increase of electric revenues, since kWh sales increased only 2.6 percent.

Eighty companies reported revenue gains in 1989, down from 90 companies a year earlier. Median revenue gain was 3.31 percent, down from 4.36 percent a year ago.

The largest revenue gain was posted by Hawaiian Electric Co., 20.76 percent, up from fourth in 1988. Idaho Power ranked second, 20.3 percent, a substantial improvement from its 49th ranking a year ago.

Income bounces back

Net income for the Top 100 rebounded in 1989, after two consecutive years of declines. For '89, income for the 99 companies reporting to *EL&P* moved ahead to $15.1 billion, a 10.8 percent increase.

Moreover, the *quality* of net income was improved in 1989.

Although the gain in net income production reversed two years of decline, the total posted by the 99 electric utilities reporting to *EL&P* still lagged behind 1984—five years earlier—when total net income for common stock hit $16.7 billion.

Interestingly, almost all of the increase came on the strength of electric utility operations. Net income of holding companies increased less than half a million dollars, reflecting the less-than-impressive performance of non-utility activities.

While total performance was improved, more utilities encountered major financial problems in 1989 than in the previous year. Ten utilities reported losses for the year, compared with a year earlier when only four utilities ended the year in the red. Pinnacle West Capital Corp., parent of Arizona Public Service Co., suffered the greatest loss (-$551.4 million) as a result of the col-

FINANCIAL STATISTICS

Company	Net Income Rank	Net Income % Gain	Revenue Rank	Revenue % Gain	Sales (KWH) Rank	Sales (KWH) % Gain	Int. Cov. Ratio 1989	Int. Cov. Ratio 1988	Earnings Per Share $ 1989	Price/Share 1989 (Dollars) High	Price/Share 1989 (Dollars) Low	% Change Long-Term Debt '88-'89
Pacific Gas & Electric	1	1,349.66	4	12.33	45	2.19	1.08	0.08	1.90	22.000	17.250	0.35
Centel*	2	229.62	21	8.47	85	-1.27	NA	NA	5.11	44.830	22.060	NA
Carolina Power & Light	3	91.08	14	9.12	43	2.68	1.53	0.77	4.20	48.000	35.000	-5.39
Idaho Power	4	79.63	2	20.33	2	17.75	1.46	0.85	22.37	30.000	22.000	-2.49
Ohio Edison	5	78.83	76	0.58	98	-10.67	0.98	0.57	2.18	24.000	18.625	-4.20
Interstate Power	6	28.95	88	-1.32	66	1.08	1.47	1.04	2.73	25.625	21.250	-0.21
Iowa Resources*	7	26.61	48	3.47	83	-0.90	1.42	1.29	1.90	22.000	17.000	-0.27
Public Service of Indiana	8	26.25	66	1.52	29	3.59	1.65	1.07	2.32	18.000	13.125	-13.00
Midwest Energy*	9	24.79	55	2.80	1	23.17	1.35	1.21	2.28	22.250	18.000	-0.07
Minnesota Power	10	23.96	71	0.75	78	0.16	1.87	1.61	2.90	27.625	22.875	1.60
Public Service of Colorado	11	21.42	51	3.29	42	2.72	1.36	1.12	2.59	27.000	20.000	-3.10
Texas Utilities*	12	21.23	40	4.02	54	1.51	1.64	1.34	4.44	37.625	27.750	1.17
Commonwealth Energy System*	13	20.10	3	17.00	73	0.58	0.95	1.08	4.14	38.375	29.750	54.25
Kentucky Utilities	14	20.09	96	-4.99	95	-6.33	2.40	2.00	2.32	20.875	17.875	0.04
Utilicorp United	15	18.19	17	8.79	48	1.99	0.98	1.05	2.04	22.250	17.500	22.21
Entech*	16	17.98	72	0.65	8	9.47	0.49	0.61	0.87	21.125	17.000	2.02
TECO Energy*	17	17.07	68	1.41	27	3.78	2.24	2.25	2.36	29.500	22.000	-0.05
Hawaiian Electric*	18	16.48	1	20.66	30	3.58	1.68	1.60	3.06	40.250	29.380	8.57
CMS Energy*	19	14.92	75	0.63	61	1.27	2.09	1.34	3.80	39.625	22.500	-1.70
Atlantic Energy*	20	12.18	38	4.31	28	3.64	1.56	1.42	3.74	39.750	32.500	24.57
Iowa Southern*	21	11.18	80	0.27	19	5.06	2.37	2.18	3.55	33.750	26.250	-0.41
MDU Resources Group	22	10.66	97	-5.33	41	2.72	1.08	0.91	1.89	23.000	17.875	-4.03
DPL*	23	9.37	91	-2.86	97	-7.20	1.47	1.34	3.27	30.875	24.125	-0.42
Eastern Utilities Associates*	24	9.08	13	9.20	62	1.27	0.40	0.42	2.95	41.750	30.375	9.02
Central Maine Power	25	8.47	23	7.66	51	1.83	0.87	0.89	1.92	20.625	16.875	-9.64
Cilcorp*	26	7.98	90	-2.61	64	1.19	1.67	1.74	3.58	39.375	31.875	-4.98
Delmarva Power & Light	27	7.77	56	2.78	16	5.91	1.42	1.45	1.80	21.250	17.000	NA
Sierra Pacific Power	28	7.10	15	9.06	4	12.86	1.18	1.13	2.05	25.875	22.375	3.02
Pacificorp	29	6.62	70	0.75	35	3.04	1.40	1.22	3.61	46.250	33.125	2.70
Washington Water Power*	30	6.60	19	8.70	12	7.14	0.83	0.98	2.70	31.375	26.000	-0.70
Pennsylvania Power & Light	31	6.44	27	6.44	44	2.68	1.21	1.13	4.05	42.875	34.250	1.20
Cincinnati Gas & Electric	32	6.28	45	3.73	25	4.27	2.19	2.17	4.34	32.375	24.375	10.05
Wisconsin Energy*	33	5.88	94	-3.07	67	1.01	2.33	2.26	2.88	32.125	25.125	-0.80
Philadelphia Electric	34	5.34	33	5.48	58	1.35	0.97	1.10	2.36	24.250	19.130	10.41
Houston Industries*	35	4.60	43	3.84	63	1.20	3.17	1.83	3.32	35.875	26.750	14.95
Duke Power	36	4.44	78	0.34	72	0.65	2.21	2.18	5.13	56.500	42.750	3.43
Northern States Power	37	4.17	84	-0.83	82	-0.14	1.91	1.89	3.24	40.000	30.250	-1.02
Florida Progress* (FPC)	38	4.06	28	6.36	55	1.45	1.73	1.85	3.67	40.250	33.250	21.40
Kansas City Power & Light	39	3.32	83	-0.69	80	-0.01	1.20	1.10	3.31	36.125	28.125	-6.80
IE Industries*	40	2.76	86	-1.11	93	-4.63	1.31	1.32	2.31	28.000	21.625	-0.64
Public Service Enterprise Group*	41	2.56	12	9.33	46	2.16	1.53	1.60	2.62	29.375	23.000	1.21
Nevada Power	42	2.47	62	2.29	9	7.96	1.52	1.67	1.81	25.875	19.250	14.44
SCEcorp*	43	2.15	9	10.42	50	1.84	1.22	1.33	3.56	41.000	31.000	-2.19
Union Electric	44	2.04	85	-0.93	76	0.41	1.51	1.31	2.61	28.625	23.000	-3.74
SCANA Corporation* (SCE&G)	45	1.56	46	3.69	38	2.96	1.36	1.51	3.04	35.750	29.625	13.36
Consolidated Edison	46	1.25	20	8.65	31	3.45	2.38	2.61	2.49	29.875	22.125	9.48
Central Vermont Public Service	47	0.76	42	3.87	74	0.50	1.25	1.34	2.59	29.000	22.125	7.53
Madison Gas & Electric	48	0.38	65	1.52	75	0.46	1.33	1.51	2.92	37.500	29.750	-0.68
American Electric Power*	49	0.33	29	6.19	5	12.18	1.19	1.16	3.25	33.375	25.750	-11.23
Iowa-Illinois Gas & Electric	50	0.26	82	-0.46	88	-2.13	1.84	1.83	4.21	46.125	37.125	-1.18
Potomac Electric Power	51	0.21	49	3.34	34	3.35	1.74	1.89	2.16	24.250	19.250	5.14
Otter Tail Power	52	0.19	92	-3.02	96	-6.60	2.23	2.22	1.94	24.375	18.750	-2.34
Orange & Rockland Utilities	53	0.06	10	10.17	32	3.40	1.29	1.40	3.14	32.000	27.250	0.93
Southern Company*	54	0.00	47	3.55	23	4.60	1.10	1.24	2.68	29.750	22.000	1.68
St Joseph Light & Power	55	-0.32	54	2.89	40	2.72	2.42	2.25	2.45	24.630	20.000	-6.04
General Public Utilities*	56	-0.47	57	2.72	79	0.15	1.50	1.74	5.01	47.250	36.250	8.97
San Diego Gas & Electric	57	-0.97	79	0.31	22	4.63	1.73	1.74	3.15	45.625	36.375	-5.66
Central Louisiana Electric	58	-1.01	36	5.11	37	2.98	1.22	1.32	3.55	36.000	31.125	-14.02
Empire District Electric	59	-1.44	99	-13.29	99	-13.61	1.67	2.02	2.94	32.125	26.500	12.33
Green Mountain Power	60	-1.82	6	11.99	3	14.56	1.59	1.94	2.36	27.875	22.125	36.21
Southwestern Public Service	61	-1.96	77	0.57	14	6.38	1.95	1.95	2.45	29.880	25.130	-1.07
IPALCO Enterprises*	62	-3.56	89	-2.36	94	-5.80	1.70	1.79	2.54	26.625	21.750	-2.44
Duquesne Light	63	-4.69	34	5.40	92	-4.60	0.72	0.75	2.03	23.875	17.375	-0.64
Allegheny Power System*	64	-4.96	39	4.04	21	4.64	1.42	1.50	3.72	42.500	35.625	-0.48
Southern Indiana Gas & Electric	65	-5.00	73	0.65	89	-2.19	1.66	1.83	2.81	32.125	27.500	4.85
Central & South West*	66	-5.56	67	1.47	53	1.51	1.11	1.44	3.25	40.250	29.750	0.91
Commonwealth Edison	67	-5.79	59	2.45	69	0.93	0.95	0.97	2.83	40.750	32.125	1.12
Rochester Gas & Electric	68	-6.14	16	9.01	39	2.87	1.02	1.04	2.10	22.125	17.000	-3.58
Oklahoma Gas & Electric	69	-6.21	41	3.93	52	1.53	1.72	1.93	3.05	39.000	32.000	-0.81
Dominion Resources*	70	-6.32	8	10.64	18	5.06	1.05	1.27	4.14	47.875	40.375	7.63
New York State Electric & Gas	71	-8.34	26	6.53	17	5.06	0.80	0.79	2.53	29.000	21.875	-1.98
FPL Group* (FP&L)	72	-8.35	30	5.88	13	7.10	1.19	1.43	3.12	36.750	29.000	2.20
KPL Gas Service	73	-8.87	95	-3.30	81	-0.04	1.32	1.55	2.05	25.375	21.750	-0.46
Puget Sound Power & Light	74	-9.95	5	12.18	6	10.90	1.24	1.38	1.88	22.500	18.000	-0.81
Northeast Utilities*	75	-10.62	63	2.24	49	1.97	0.92	1.22	1.92	23.000	18.500	-7.24
Baltimore Gas & Electric	76	-10.99	24	7.54	33	3.38	1.65	2.18	3.05	34.875	28.500	11.66
Wisconsin Power & Light	77	-11.14	74	0.65	26	4.09	1.86	2.04	1.93	24.500	21.875	-2.91
Louisville Gas & Electric	78	-11.84	58	2.61	11	7.80	1.30	1.67	3.20	41.750	32.000	12.39
Central Hudson Gas & Electric	79	-12.17	25	7.21	10	7.82	0.79	0.94	2.28	24.125	20.375	-0.26
Wisconsin Public Service	80	-13.50	93	-3.06	59	1.32	1.92	2.30	1.98	24.875	20.500	-0.39
Central Illinois Public Service	81	-18.44	87	-1.31	71	0.70	1.59	1.98	1.91	24.125	20.125	0.02
Northern Indiana Public Service	82	-30.29	61	2.32	56	1.42	0.62	0.77	1.00	19.625	13.125	-3.56
Niagara Mohawk Power	83	-33.86	44	3.77	65	1.15	0.35	0.60	0.78	14.750	10.750	10.93
Kansas Gas & Electric	84	-38.88	69	1.39	7	10.79	0.56	0.82	1.36	24.250	19.000	-5.96
TNP Enterprises* (Tex-NM Power)	85	-62.40	50	3.31	60	1.28	1.06	1.24	1.90	22.375	19.000	16.55
Portland General*	86	-127.68	35	5.37	24	4.34	-0.13	1.30	-0.22	25.500	20.875	-4.14
Boston Edison	87	-148.22	32	5.55	20	4.89	-0.31	0.70	-0.88	22.125	15.375	-1.83
Tucson Electric Power	88	-172.79	98	-6.53	91	-4.52	-1.40	3.07	-3.55	50.250	16.130	8.47
Middle South Utilities*	89	-214.98	37	4.45	57	1.37	-0.72	0.59	-2.31	23.250	15.500	-3.17
United Illuminating	90	-221.24	60	2.36	77	0.28	-0.72	0.66	-5.87	34.250	24.750	2.49
Illinois Power	91	-314.50	64	2.17	70	0.72	-1.48	0.72	-4.34	21.750	13.375	0.44
Gulf States Utilities	92	-370.50	31	5.72	68	0.99	-0.36	0.13	-1.00	14.375	7.625	-8.32
El Paso Electric	93	-1071.47	7	11.55	15	6.38	-1.73	0.20	-3.35	15.375	6.500	22.61
Pinnacle West Capital*	94	-13257.12	53	2.99	86	-1.53	0.82	1.17	2.53	16.375	5.000	2.83
Detroit Edison	95	NA	52	3.25	84	-0.91	0.83	-0.90	2.65	25.875	19.125	7.61
New England Electric*	96	NA	22	8.13	36	3.00	1.52	-0.41	2.36	28.875	22.250	14.29
Long Island Lighting	97	NA	11	9.81	47	2.00	-0.35	-2.60	-1.51	20.250	12.625	32.31
Public Service of New Mexico	98	NA	18	8.72	90	-2.28	0.93	-2.74	1.73	15.250	11.125	-18.26
Centerior Energy*	99	NA	81	0.00	87	-1.84	0.72	-0.20	1.90	20.875	13.375	-0.51
Public Service of New Hampshire	100	NA	100	NA	100	NA	NA	NA	NA	NA	NA	NA

ALPHABETICAL LISTING OF COMPANY PERFORMANCE

Company	Electric Sales (KWH) (millions)	Electric Sales Rank	Customers Served: Electric Total	Customers Served: Electric % Gain	Customers Served: Gas Total	Customers Served: Gas % Gain	Revenues Total $ (1000's)	Revenues % Electric	Revenues % Gas	Net Income After Tax $ (Thousands)
Allegheny Power System*	59,134	9	1,270,634	1.58	0	0.00	2,258,203	100.00	0.00	194,908
American Electric Power*	117,505	2	2,715,784	1.22	0	0.00	5,140,392	100.00	0.00	628,917
Atlantic Energy*	7,618	70	440,720	2.55	0	0.00	705,020	100.02	0.00	80,964
Baltimore Gas & Electric	24,791	31	1,012,144	2.12	519,726	0.19	2,004,136	75.81	20.55	243,910
Boston Edison	13,753	49	672,992	1.41	0	0.00	1,269,345	100.00	0.00	(33,788)
Carolina Power & Light	38,597	16	950,492	2.10	0	0.00	2,480,803	100.00	0.00	376,067
Centel*	2,655	94	136,093	0.15	0	0.00	1,187,675	13.89	0.00	445,250
Centerior Energy*	27,581	27	1,020,616	0.69	0	0.00	2,302,436	100.00	0.00	266,886
Central Hudson Gas & Electric	5,625	78	249,501	2.33	53,747	2.25	470,002	85.79	14.21	33,419
Central Illinois Public Service	7,496	73	306,853	0.30	158,056	0.55	492,958	100.00	0.00	65,366
Central Louisiana Electric	5,424	79	199,466	0.53	0	0.00	316,471	100.00	0.00	39,884
Central Maine Power	9,137	64	488,818	5.22	0	0.00	704,085	100.00	0.00	45,402
Central Vermont Public Service	3,195	92	137,000	2.24	0	0.00	229,307	98.63	0.00	17,247
Central & South West*	48,198	13	1,546,000	0.98	0	0.00	2,549,000	96.51	3.22	306,000
Cilcorp*	4,987	85	185,363	0.75	189,220	1.09	458,630	61.18	30.81	48,399
Cincinnati Gas & Electric	19,100	38	668,868	2.00	392,731	2.03	1,437,511	72.64	27.36	219,434
CMS Energy*	29,667	26	1,452,901	1.56	1,338,489	1.93	2,961,100	58.16	40.25	312,142
Commonwealth Edison	72,211	4	3,179,622	1.31	0	0.00	5,751,050	100.00	0.00	598,503
Commonwealth Energy System*	7,290	74	342,000	2.09	224,000	1.82	805,860	65.09	33.27	40,145
Consolidated Edison	34,935	20	2,920,693	0.78	1,028,491	0.17	5,550,621	82.46	12.49	568,746
Delmarva Power & Light	10,829	56	361,160	2.73	82,883	3.26	789,707	85.90	10.98	91,308
Detroit Edison	40,585	15	1,905,345	1.23	0	0.00	3,203,031	99.01	0.00	388,933
Dominion Resources*	55,907	12	1,747,285	2.60	0	0.00	3,699,900	93.49	0.00	410,700
DPL*	12,584	54	449,084	1.06	276,421	0.78	960,463	74.05	24.77	136,354
Duke Power	66,628	6	1,595,037	1.91	0	0.00	3,648,238	99.76	0.00	519,134
Duquesne Light	13,739	50	572,592	0.62	0	0.00	1,120,680	100.00	0.00	113,002
Eastern Utilities Associates*	4,162	90	256,602	1.50	0	0.00	408,577	97.95	0.00	40,877
El Paso Electric	5,873	76	239,137	2.55	0	0.00	426,248	99.43	0.00	(117,645)
Empire District Electric	3,121	93	116,037	2.04	0	0.00	133,361	99.52	0.00	16,745
Entech*	10,023	58	247,568	0.68	110,947	3.12	271,909	126.22	39.97	42,676
Florida Progress* (FPC)	26,511	29	1,129,078	3.72	0	0.00	2,129,400	71.93	0.00	187,100
FPL Group* (FP&L)	64,146	7	3,122,859	3.46	0	0.00	6,197,796	77.15	0.00	410,416
General Public Utilities*	38,511	17	1,841,605	1.37	0	0.00	2,911,194	99.96	0.00	282,464
Green Mountain Power	2,452	95	76,333	2.54	0	0.00	144,028	99.17	0.00	8,736
Gulf States Utilities	27,466	28	563,277	1.02	82,681	0.21	1,607,406	93.43	2.26	(108,412)
Hawaiian Electric*	7,649	69	339,839	2.76	0	0.00	884,115	68.42	0.00	64,075
Houston Industries*	57,798	11	1,353,475	1.71	0	0.00	3,789,780	82.29	0.00	413,452
Idaho Power	14,004	48	284,377	1.73	0	0.00	496,161	100.00	0.00	80,452
IE Industries*	4,487	86	208,447	0.73	122,540	0.51	433,374	70.91	23.46	35,097
Illinois Power	15,841	45	548,726	0.42	386,960	0.42	1,312,630	75.27	24.73	(325,797)
Interstate Power	4,359	89	157,489	0.46	46,050	0.68	270,712	79.23	20.77	25,387
Iowa Resources*	5,242	84	249,234	1.34	0	0.00	360,570	97.02	0.00	41,703
Iowa Southern*	2,158	97	94,185	0.45	38,252	0.63	137,692	74.76	23.40	20,468
Iowa-Illinois Gas & Electric	4,445	88	192,516	0.53	229,705	0.66	494,084	58.41	41.59	56,499
IPALCO Enterprises*	11,248	55	379,261	1.61	0	0.00	595,036	95.89	0.00	95,514
Kansas City Power & Light	10,220	57	409,467	1.17	0	0.00	731,480	98.98	0.00	102,259
Kansas Gas & Electric	8,944	66	254,810	1.18	0	0.00	533,533	98.09	0.00	46,672
Kentucky Utilities	13,135	51	412,300	1.38	0	0.00	531,895	100.00	0.00	87,921
KPL Gas Service	9,798	61	302,127	1.16	1,066,262	0.78	1,127,623	40.11	59.89	70,921
Long Island Lighting	16,802	44	996,487	0.75	426,060	1.10	2,347,614	84.48	15.52	(167,835)
Louisville Gas & Electric	9,775	62	320,577	0.93	243,625	1.13	676,900	72.59	27.41	66,625
Madison Gas & Electric	2,216	96	111,055	1.43	84,556	3.10	217,588	60.59	39.34	20,038
MDU Resources Group	2,147	98	109,691	-0.32	175,835	0.17	263,328	45.96	54.04	16,508
Middle South Utilities*	58,864	10	1,706,595	0.77	156,232	-2.06	3,724,004	97.57	2.43	(472,585)
Midwest Energy*	5,301	82	155,933	0.34	346,594	0.48	572,528	40.69	49.88	49,174
Minnesota Power	9,912	60	119,521	1.34	17,991	101.69	463,902	83.63	2.26	84,140
Nevada Power	8,391	67	318,036	10.05	0	0.00	418,373	100.00	0.00	51,467
New England Electric*	21,394	34	1,253,425	1.61	0	0.00	1,643,199	93.83	0.00	138,650
New York State Electric & Gas	17,516	42	757,979	1.77	142,403	2.13	1,427,745	88.72	11.28	144,804
Niagara Mohawk Power	35,396	19	1,504,000	1.48	466,000	1.75	2,906,043	83.23	16.77	105,601
Northeast Utilities*	24,892	30	1,251,680	1.30	0	-100.00	2,330,517	92.61	5.33	209,083
Northern Indiana Public Service	12,936	52	377,457	1.20	585,789	1.42	1,559,565	56.57	43.43	72,112
Northern States Power	34,747	21	1,300,119	1.51	345,233	3.41	1,989,714	83.15	16.32	202,619
Ohio Edison	31,878	24	1,025,709	1.00	0	0.00	2,154,969	98.83	0.00	332,932
Oklahoma Gas & Electric	19,508	37	638,558	0.40	0	0.00	1,141,319	100.00	0.00	126,920
Orange & Rockland Utilities	4,461	87	245,685	1.82	104,189	1.70	536,194	76.10	23.38	40,321
Otter Tail Power	3,257	91	121,301	-0.02	0	0.00	172,840	100.00	0.00	23,068
Pacific Gas & Electric	63,791	8	4,110,000	2.07	3,372,000	2.19	8,588,264	72.38	27.62	900,628
Pacificorp	47,691	14	1,217,631	1.34	0	0.00	2,173,597	99.96	0.00	329,566
Pennsylvania Power & Light	34,672	22	1,143,591	1.87	0	0.00	2,356,446	99.93	0.00	353,436
Philadelphia Electric	32,675	23	1,453,185	1.10	340,186	2.24	3,405,629	88.68	11.32	493,807
Pinnacle West Capital*	17,489	43	594,820	2.20	0	0.00	1,507,909	95.97	0.00	(551,415)
Portland General*	17,889	41	565,824	2.47	0	0.00	796,910	98.39	0.00	(26,933)
Potomac Electric Power	23,485	33	638,116	1.97	0	0.00	1,394,909	99.98	0.00	174,252
Public Service Enterprise Group*	37,271	18	1,848,755	0.88	1,448,732	1.12	4,804,852	68.26	28.36	542,137
Public Service of Colorado	19,716	36	983,616	0.98	853,065	1.38	1,740,666	65.46	33.16	136,195
Public Service of Indiana	20,690	35	586,278	1.59	0	0.00	1,059,165	98.20	0.00	125,230
Public Service of New Hampshire	NA	100	0	NA	0	0.00	NA	NA	NA	0
Public Service of New Mexico	8,006	68	287,083	1.85	339,227	0.99	915,310	67.78	30.90	72,137
Puget Sound Power & Light	18,779	39	717,538	3.76	0	0.00	887,773	100.00	0.00	104,367
Rochester Gas & Electric	7,558	71	325,738	1.27	258,280	1.63	845,697	68.72	31.28	71,444
San Diego Gas & Electric	14,439	47	1,069,610	3.59	661,503	2.91	2,082,485	63.62	14.42	175,924
SCANA Corporation* (SCE&G)	14,885	46	435,001	1.85	205,657	2.11	1,123,283	73.19	26.45	122,625
Sierra Pacific Power	5,275	83	232,215	3.48	73,741	4.29	445,411	81.40	11.50	44,990
SECcorp*	69,136	5	3,940,949	2.85	1,198	0.42	6,904,386	94.41	0.01	778,241
Southern Company*	136,872	1	3,238,000	1.60	0	0.00	7,492,000	99.19	0.00	846,000
Southern Indiana Gas & Electric	5,344	80	113,851	0.79	94,252	1.52	316,506	78.32	20.11	34,931
Southwestern Public Service	18,094	40	347,742	-0.02	0	0.00	799,031	99.49	0.00	100,286
St Joseph Light & Power	1,305	99	58,899	1.18	6,078	32.53	79,082	86.54	5.83	10,678
TECO Energy*	12,896	53	453,455	2.32	0	0.00	1,060,022	87.33	0.00	133,832
Texas Utilities*	81,943	3	2,131,870	1.01	0	0.00	4,320,528	100.00	0.00	779,084
TNP Enterprises* (Tex-NM Power)	6,212	75	201,105	0.97	0	0.00	378,289	100.00	0.00	15,408
Tucson Electric Power	7,505	72	264,825	1.61	0	0.00	507,621	100.00	0.00	(89,851)
Union Electric	30,146	25	1,078,784	1.09	111,269	1.31	2,010,306	96.00	3.82	266,471
United Illuminating	5,307	81	307,654	0.14	0	0.00	531,181	99.37	0.00	(81,583)
Utilicorp United	5,849	77	252,168	2.48	534,867	31.36	731,933	39.06	60.94	48,314
Washington Water Power*	9,970	59	244,530	0.77	87,710	2.84	589,509	66.88	12.94	60,321
Wisconsin Energy*	24,293	32	882,883	2.15	0	0.00	1,493,353	83.42	0.00	193,957
Wisconsin Power & Light	9,600	63	336,259	1.00	121,111	2.69	604,818	76.56	17.82	51,482
Wisconsin Public Service	8,957	65	322,582	1.54	172,519	1.86	585,812	75.61	24.39	45,694

Rank '89	Rank '88	Company	$ Income (millions)	'89% Change
1	60	Pacific Gas & Electric	900,628	1349.66
2	1	Southern Company*	846,000	0.00
3	3	Texas Utilities*	779,084	21.23
4	2	SCEcorp*	778,241	2.15
5	5	American Electric Power*	628,917	0.33
6	4	Commonwealth Edison	598,503	-5.79
7	6	Consolidated Edison	568,746	1.25
8	7	Public Service Enterprise Group*	542,137	2.56
9	8	Duke Power	519,134	4.44
10	9	Philadelphia Electric	493,807	5.34

lapse of its Mera Bank subsidiary and serious problems with its real estate and mineral prospecting operations. Middle South Utilities, now Entergy Corp., also suffered heavily (-$472.6 million) as a result of continuing problems over its nuclear facilities.

There were some changes in the ranking of the biggest income producers. PG&E, after falling to 60th last year, jumped to the top in 1989, dropping Southern Company to second. SCECorp fell to fourth from second a year ago. Commonwealth Edison Co. also dropped two positions, to sixth in '89.

In terms of performance, PG&E also ranked first, on the strength of its recovery from its '88 drop to 88th position. Centel, with two small electric utility operations, moved into the runnerup spot on the strength of its extensive communications operations.

Most of the companies posting large gains in 1989 were recovering from poor performances in 1988. For example, seven of the top 10 performers this year were among the 25 poorest performers a year ago.

Also, most of the top income growth performers began with substantial revenue growth. For example, PG&E's lead came on revenue increases ranked 4th; and Idaho Power's 4th ranking came on revenue gains ranked 2nd. Exceptions were Interstate Power Co., 6th in income gain on revenue gains that ranked 88th; Iowa Resources Inc., 7th in income gain but 48th in revenue gain; and Minnesota Power Co., 10th in income growth on the strength of revenue gains ranked 71st. The high rankings of these latter three companies, achieved without unusually high revenue increases, reflect substantial efforts to control costs.

Median income growth was only slightly better than no growth at all, at just 0.26 percent, and was below median 1988 income growth of 1.56 percent.

The improvement in quality of net incomes results from reductions in Allowances for Funds Used During Construction as construction projects have been concluded and/or reduced. AFUDC is an accounting entry that increases net income without actually creating cash. Reducing AFUDC generally means income and earnings reflect *real* performance.

Earnings off

Per-share earnings declined in 1989, to an average of $2.19 from $2.30 (restated) a year earlier, reflecting increases in total shares outstanding. As mentioned previously, however, the quality of the earnings was stronger.

The median earnings gain also was off slightly in 1989, falling to 0.31 percent from 0.54 percent in '88. A total of 66 of 99 companies posted earnings above the average; a year ago 56 companies exceeded the average rate.

Interest in information acquisition and control systems flourishes

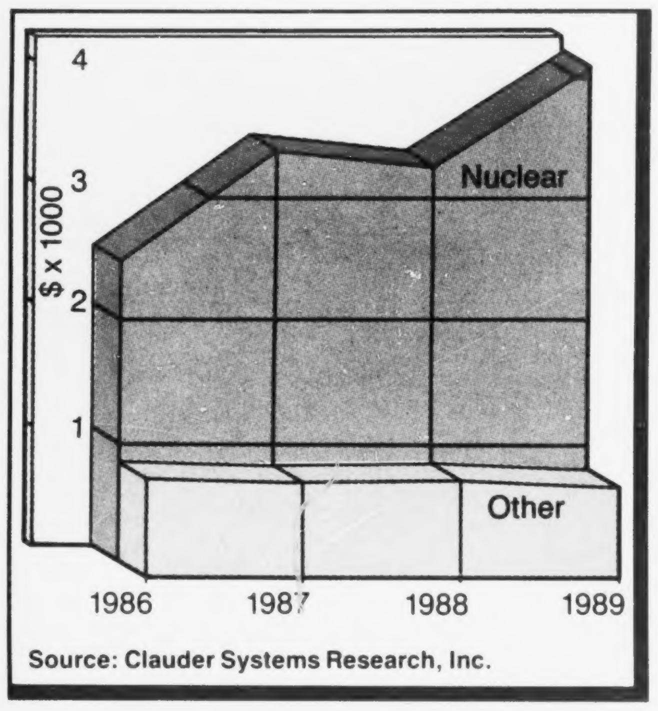
The need for adequate, accurate data to operate and control power systems from generation control to distribution automation has never been more essential than during these present times.

This emphasis is reflected in the recent survey and report by Clauder Systems Research Inc. (CSR), San Jose, CA. The report on generating plant monitoring and control systems identifies 496 projects, valued at $527 million, that are planned for between December 1989 and June 1992 (2.5 years).

Generation

Data for the monitoring and control in electric utility generating plants includes all U.S. and Canadian utilities with capacities of 30 MW or more. Data from 1985 through 1989 indicate a sharp rise for planned non-nuclear-plant systems in 1988 to almost $400 million but then drops to about $300 million in 1989.

Systems for nuclear plants show a steady drop from 1985 through 1987 but then show a steady gain for 1988 and 1989, reaching a level of about $190 million. The average cost per system for non-nuclear plants is decreasing to about $800,000 while the nuclear systems show a fairly significant increase, especially in the last three years, to a level of about $4 million.



Source: Clauder Systems Research, Inc.

Average cost of nuclear plant monitoring and control systems shows steady increase compared with a slight decrease for other plant systems. Cost of control system hardware (other than distributed control systems) is decreasing.

EMS/SCADA

Other CSR reports indicate similar interest in Energy Management Systems (EMS) and Supervisory Control and Data Acquisition (SCADA) with an installed base of 525 projects, both valued at $997 million with an additional 688 projects to be awarded in the next 30 months valued at $710 million.

Report	Projects	Value
Generation	497	$525-M
EMS/SCADA (existing)	525	$997-M
EMS/SCADA (pending)	688	$710-M
AM/FM	323	$228-M
DAS	137	$ 36-M
LMS	246	$162-M

Source: Clauder Systems Research, Inc.

European utilities have a similar amount ($744 million) planned for 317 EMS/SCADA systems in the same time period. Almost $10 million of this was for Remote Terminal Unit (RTU) add-on projects. CSR contacted over 900 utilities in 19 countries to gather the data.

Interest in automated mapping (AM), facilities management (FM) and geographic information systems (GIS) was evident at the recent AM/FM International meeting in Baltimore. Some 1533 attendees from the U.S. and several foreign countries were at the 13th annual conference—up from a little over 1000 last year.

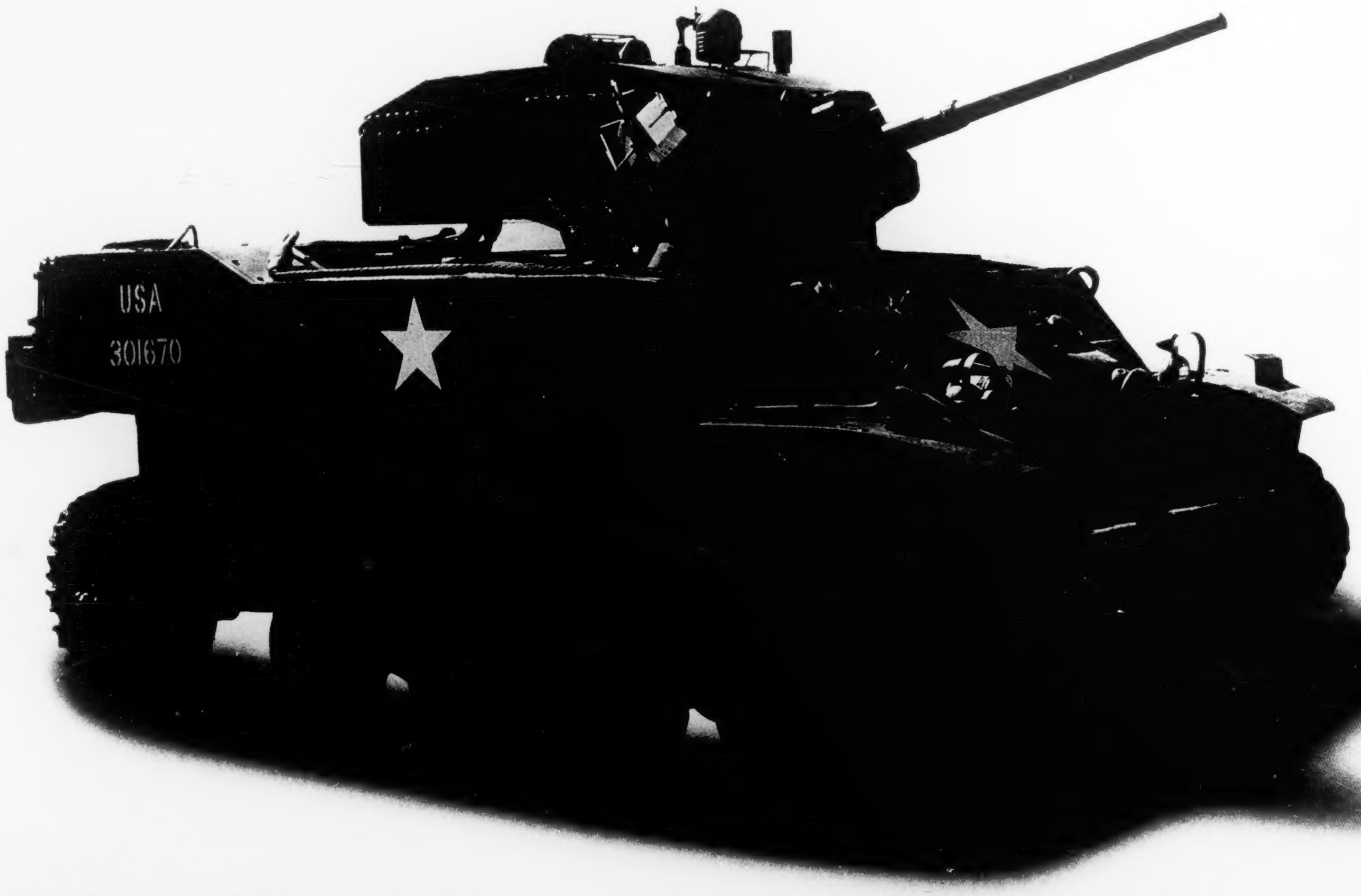
There was also a significant increase in exhibitors this year—155 compared to 108 last year. Next year's conference in San Diego promises to be even bigger and better according to Robert M. Samborski, executive director of AM/FM International.

Executive symposium

AM/FM International is sponsoring an Executive Management Symposium in Keystone, CO, July 8-10 geared primarily for utility management who are interested in learning more about how this relatively new technology may fit into their systems.

For additional information contact: Robert M. Samborski, AM/FM International, 14456 E. Evans Ave., Aurora, CO 80014, 303/337-0513.

For more information on CSR Reports contact: Hershel E. Clauder, 4855 Atherton Ave., Suite 202, San Jose, CA 95130, 408/370-7382.



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AUGUST 1990
ELECTRIC LIGHT & POWER
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LATE NEWS

Kansas City P&L launched an $857-million hostile tender offer for neighbor Kansas G&E.

State regulators approved Northeast Utilities' $2.3-billion takeover of Public Service Co. of New Hampshire; the deal requires FERC approval. Seabrook first went to full power on July 19.

Westinghouse agreed to buy 22% of CMS Energy's Palisades nuclear plant. Betchel is to buy 33%. Michigan regulators oppose the plan. An NRC OK is needed.

Public Service Co. of Colorado plans to decommission and repower the closed Fort St. Vrain nuclear unit as an IPP in 5 yrs.

Wheeler Peak Capital Corp. expressed interest in buying Public Service Co. of New Mexico: $12 per share cash, plus equity. PNM is evaluating the suggestion.

Pinnacle West shareholders told PacifiCorp a fair offer would be $30/share in 2 yrs. See below.

No immediate capacity concerns for Top 100

BARRINGTON, IL—Generation capacity problems still lie ahead of the nation's Top 100 electric utility companies. They appear to be doing better than the industry as a whole, since their figures reflect a small increase in reserve margins during 1989. This is a primary conclusion drawn from this year's Top 100 Operations Report, the 20th annual.

This conclusion differs substantially from industrywide reports.

As usual, peak demands were up for the Top 100 electric utilities. But surprisingly, reserve margins were up also, from an average of 17.7 percent in 1988 to 19.3 percent in '89.

This increase, which amounts to 29.7 GW of capacity, was a surprise because the Edison Electric Institute said the worrisome trend of utility capacity margins declining overall continues apace even now. The North American Electric Reliability Council concurs—its estimated capacity margin for the country declined from 22.7 percent in 1989 to 22.0 percent for 1990.

Meanwhile, the mix of types of generation continued to change, also.

Combustion turbines once more added an important and growing amount to the mix of technologies.

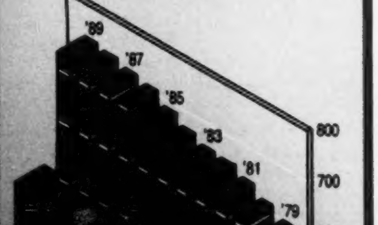
The Top 100 also increased their natural gas usage by 21.8 percent in '89, while adding only 8.9 percent to the amount of coal consumed. And again, the trend of oil consumption was upward—an increase of 46.7 percent was reported.

The nuclear capacity of the Top 100 increased, on average, by 6.4 percent in '89, after losing ground (by 1.6 percent) in '88 compared to '87. The lack of nuclear plant construction planning will decrease capacity growth in this area as plants underway are completed.

To quote from the Energy Information Administration's *Annual Outlook for U.S. Electric Power 1990*, "...the need for additional capacity *beyond what utilities have announced* [emphasis added] ranges from 183 to 267 gigawatts by 2010."

On balance, this year's report seems to show an industry that is caught between conflicting needs and demands, with no clear path ahead.

INSTALLED GENERATING CAPACITY
(Total Electric Utility Industry)



Source: EEI 1989 Statistical Yearbook (advance release)

Top 100
20th annual report
starts on page 27

Pinnacle West shareholders ask PacifiCorp to halt offers

PHOENIX—Shareholders of beleagured Pinnacle West Capital Corp. have urged PacifiCorp to refrain from making further offers for the parent of Arizona Public Service Co. (APS).

In a formal position statement, the Board of Directors of the Pinnacle West Shareholders Association (PWSA) requested that PacifiCorp make no more offers for Pinnacle West pending the outcome of APS' rate case, currently before the Arizona Corporate Commission.

Adequacy questioned

The association's board questioned the adequacy of PacifiCorp's offer and challenged PacifiCorp's success in convincing institutional investors that its offer of $21 per share is adequate. In its formal resolution, PWSA declared that "The offer has been judged to be inade-

Continued on page 6

Iowa Board OKs IR-ME merger

DES MOINES, IA—The Iowa Utilities Board has given its approval to the merger of Iowa Resources and Midwest Energy Co. (see *EL&P*, May 1990, p.4).

The merger will create a new holding company, Midwest Resources Inc., with total assets of $2.3 billion. Combined revenues of the two companies in 1989 were $933 million.

Midwest Resources will be headquartered in Des Moines.

There has been no response to required merger information filed with the Federal Trade Commission and the Securities and Exchange Commission.

Pleased with prompt response

Mark W. Putney, chairman and CEO of Iowa Resources, headquartered in Des Moines, said the participants are "pleased with the decision...of the Iowa Utilities Board."

Iowa Power, with approximately 250,000 electric customers, is the principal subsidiary of Iowa Resources. Iowa Public Service Co. has 156,000 electric customers and 347,000 natural gas customers and is Midwest Energy's main subsidiary.

CECo told to refund $400M, roll rates back

CHICAGO—Commonwealth Edison Co. took a double-barreled blast from the Illinois Commerce Commission in late June.

The ICC ordered the utility to refund $400 million collected from customers, under the first step of a two-step phase-in of nuclear plant costs, since Jan. 1, 1989, subject to 5 percent annual interest. The order maintained the rate structure in effect on Jan.1 1989, however.

Then, a day later, the commission ordered the utility to abandon the rate under which the money was collected, amounting to a rate rollback of about $235 million per year, to the level charged by the utility before the Jan. 1, 1989 phase-in increase.

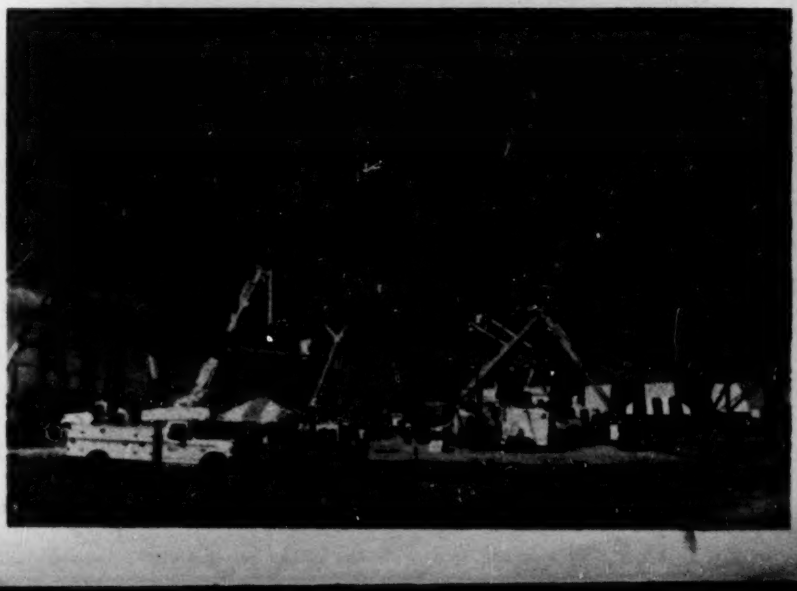
The second step of the phase-in program never was instituted.

Following court order

The Commission's actions resulted from the Illinois Supreme Court's decision that the utility's request for a rate phase-in and structural reorganization effective Jan. 1, 1989, which the commission had approved, was illegal because the commission acted outside its

Continued on page 8

Live-line maintenance: a hot topic at ESMO-90



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NEWS BRIEFS

JILL MINNER, Special Projects Editor

SCC staff proposes competitive bidding rules for VA utilities

The Virginia State Corporation Commission said its public utilities staff has proposed formal rules for electric utilities seeking bids for capacity power from other power sources. The staff's formal bidding-rules recommendation would replace the SCC's current nonbinding guidelines. "While the rules allow the host utility considerable discretion in conducting competitive bid solicitations, they also include several changes that better protect the interests of the parties offering to sell power to the utility," according to the staff. The suggested rules include:

- Proposals should compete with the utility's own building option.
- The environmental impact of projects should be given weight in the bid evaluation.
- Directly affiliated companies should not participate in a utility's capacity solicitation.
- Utilities with active bidding programs should be allowed to refuse capacity offers made outside the bidding process.
- Negotiating a purchased power contract outside the bidding process should require SCC approval.
- The SCC should provide a forum to resolve disputes over the solicitation and evaluation of purchased power offers.

New Hampshire Yankee head to retire Oct. 1

Edward A. Brown, president and chief executive officer of Seabrook Station operator New Hampshire Yankee (NHY), announced his plans to retire on Oct. 1, 1990. "I was hired to do a job—to head the company responsible for getting Seabrook Station built and on-line to produce electricity for an energy-starved region," Brown explained. "...Seabrook Station is licensed and producing electricity, and will soon be in full commercial operation...Now, it's time for me to spend more time with my family and do some other things." NHY Senior Vice President and Chief Operating Officer Ted C. Feigenbaum is expected to take over for Brown when he retires, according to the company.

Women in Energy Inc. honors DOE director

At its national conference in Chicago this month, Women in Energy Inc. will honor Gail de Planque, director of the U.S. Department of Energy Environmental Measurements Laboratory. She will receive the 1990 Woman of Achievement in Energy Award for her significant scientific, technical and public information contributions that have lead to safer world-wide energy development and environmental protection of the Earth. Women in Energy is an energy communications network founded in 1978 to promote research, knowledge and understanding of all forms of energy.

NCA names chairman; presents service award

The National Coal Association has chosen Wayne T. Ewing as president and J.E. "Jack" Katlic as vice chairman. Ewing, who replaces W. Carter Grinstead, is president of Peabody Development Co. Katlic is senior vice president of American Electric Power Service Corp.

In other news, NCA presented its Distinguished Service Award to Robert H. Quenon for being "a leader whose unselfish contributions throughout his career have fostered the goals and objectives of the entire American coal industry." Quenon is president and chief executive officer of Peabody Holding Co. Inc.

Westinghouse picks new chairman, CEO

Paul E. Lego has taken over as chairman and chief executive officer of Westinghouse Electric Corp., the company announced. Lego, previously president and chief operating officer, succeeds John C. Marous who has retired. "Paul Lego has been one of the chief architects of the business strategies that have made Westinghouse one of the highest-performing blue-chip stocks over the past decade," noted Marous. "His outstanding performance and depth of experience throughout his 34-year career with Westinghouse ideally position him to lead the corporation in the years ahead."

Pardus appointed chairman, Stevens is president at EUA

Eastern Utilities Associates has announced the appointment of Donald G. Pardus as chairman and chief executive officer and John R. Stevens as president and chief operating officer. Pardus succeeds John F.G. Eichorn Jr. who will continue as a member of EUA's Board of Trustees. "I feel privileged to have had the opportunity to work with John Eichorn the past 11 years, and I am pleased he will continue to provide EUA with his insight and wisdom as a member of the Board of Trustees," stated Pardus. Stevens most recently served as senior exeuctive vice president and chief operating officer. "We are fortunate to have Stevens as president, to lead our management team as Eastern Utilities Associates moves forward to meet the challenges of the future," Pardus added.

Consumers Power wins national safety award

Consumers Power Co. said it has been named the nation's safest major gas and electric utility by the National Safety Council for the third consecutive year. The first place award was given to Consumers Power for having achieved the safest work performance in 1989 for a large combination utility. "For Consumers Power to maintain its high level of safety performance so consistently, over such a long period of time, is a truly remarkable accomplishment," said NSC President T.C. Gilchrest. Consumers Power has received the award six times in the past nine years.

AP&L donates mobile learning laboratory

Automated Learning Laboratory

Earlier this year, Entergy Corp. and one of its operating subsidiaries, Mississippi Power & Light Co., donated a Mobile Automated Learning Laboratory in cooperation with Mississippi Delta Community College. A second lab was recently unveiled in Arkansas and a third lab will be put into service later this year in Louisiana.

Arkansas Power & Light Co. and its parent company, Entergy Corp., recently donated a Mobile Automated Learning Laboratory in Little Rock, AR. Entergy, AP&L and the Vocational and Technical Education Division of the Arkansas Department of Education (VoTech) unveiled the $168,000 laboratory which will operate in seven East Arkansas counties. According to VoTech, the main purpose of the mobile lab is to teach basic literacy skills and offer vocational instruction to industry employees. Special training will be provided for potential employees of existing industries or businesses relocating to the area. The lab will also be used for adults seeking their high school equivalency certificates and for special projects with AP&L and Entergy Corp.

Entergy Corp. named Employer of the Year

Entergy Corp. Vice President of Human Resources Rad Eanes (right) accepts the Employer of the Year award from Charles Holland, president of the Louisiana Liaison Group. Entergy was recently honored by the Liaison Group for its leadership among Louisiana companies in the affirmative action and community involvement area. The Liaison Group, which serves as liaison to the U.S. Department of Labor's Office of Federal Contract Compliance Program, consists of equal employment opportunity and human resources professionals from Louisiana's public and private sector.

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We need another WHAT???

For the last 25 years, there have been very few equipment exhibitions and expositions of interest to personnel in the electric utility industry. But now, the industry faces the prospect of being inundated in major fall trade shows. The Edison Electric Institute is the Johnny-come-lately, announcing it will sponsor a trade show – the seventh to be held in a 60-day period next fall – to be conducted in conjunction with EEI technical committee meetings.

One can only ask, is this new show necessary? Will it be an added value to the industry? Or will it just be a way for EEI to add to its coffers?

Before the EEI announcement, the fall of 1991 was already full of established industry trade shows. Both the ASME/IEEE Joint Power Generation Conference and the PowerGen '91 Conference (successor to the Coal Technology Conferences of the '70s and '80s) will conduct their fourth annual expositions. The IEEE Transmission and Distribution Conference and Exposition, the industry's largest exposition, held every 30 months, will open in September '91. A couple of weeks later, the International Construction and Utility Equipment Exposition, held every two years, will offer participants the chance to see construction and maintenance equipment in operation.

Other established fall exhibitions include the World Energy Engineering Congress, sponsored by Association of Energy Engineers, and the annual meeting and exposition of the American Cogeneration Association and the Cogeneration and Independent Power Coalition of America.

EEI is promoting its fall exposition for generation, transmission and distribution personnel of member utilities (only). EEI has elected to join a British trade-show promoter to develop the show.

EEI is using the promise of committee-member attendance as a selling point for the exposition. And it can be expected to use the exposition as a selling point to attract committee members to its to-be rescheduled fall committee meetings. Since EEI stands to make a few bucks too, the idea must sound great to EEI's new, market-oriented management.

But the new show has heightened fears on the part of suppliers, who have complained to us that they will be subjected to even more pressure to exhibit than was experienced with EEI's spring annual convention exhibition. Downsized manufacturers, many of whom are in no position to withstand even indirect pressures from their largest customer base, may need the broader exposure that other shows may offer, but complain they may not be able to chance the risks of *not* being in EEI's show.

The essential question is whether EEI's effort will benefit the industry, or will it merely serve to dilute the comprehensive values offered by existing, established expositions. We find it hard to see that it will be anything but counterproductive.

Robert A. Lincicome, Editor-in-Chief

1st utility software directory will cover 350+ programs

TULSA, OK – The electric utility industry will see its first software directory containing more than 350 programs in 28 subject classifications, said the publisher, PennWell Books.

"The *EL&P* Electrical Industry 1991 Software Directory" will include more than 150 suppliers listed two ways, alphabetized according to program titles within subject categories, and an alphabetized listing of suppliers with the programs they offer. The book is edited by H. Wayne Beaty, *Electric Light & Power*'s senior editor – transmission/distribution.

Software subject classifications range from electric utility accounting to transportation vehicles and cover all areas of operations including the latest developments in construction, engineering, design, dispatch, mapping, maintenance, marketing and training, according to PennWell Books.

The soft-cover book is $165, plus $3.50 postage and handling for prepaid orders within the U.S. and Canada. Sales tax will be applied as required. To order or for more information contact: Liz Speck, 1-800-752-9764.

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Heat sizzles Southwest; reservoirs shrink

Record heat baked the Southwest the last week in June. Record temperatures, such as 121° in Phoenix and 112° in Los Angeles, led to record demands on the region's utilities. The fourth dry year in Southern California Edison Co. territory is evident at Shaver Lake, part of SCE's six-lake, 1000-MW hydroelectric complex. Shaver Lake is currently 40,000 acre-feet in area, down from its normal 137,000 acre-feet. The boat dock was moved several hundred yards due to the lake's shrinking size.

NARUC issues annual survey of summer electric bills

WASHINGTON – The average cost of electricity during the summer of 1989 was 8.32 cents per kilowatthour, according to the National Association of Regulatory Utility Commissioners' (NARUC) national survey of summer electric bills.

NARUC found that residential customers in the Northeast and Pacific regions paid more on average for electricity than did customers in the Northwest and Rocky Mountain regions.

Customers in the least expensive service territory, Lewiston, ID, paid approximately 4.2 cents per kilowatthour, while customers in Chicago, IL, the most expensive service territory, paid about 14 cents per kilowatthour, according to the survey.

NARUC said its survey contains comparisons for the largest service territories of the major investor-owned regulated electric utilities in 49 states and the District of Coumbia.

A total of 187 distinct service territories were surveyed for residential service during June, July and August of 1989. Typical residential summer electric bills varied by more than 230 percent depending on the service territory, according to NARUC.

Copies of the survey can be obtained for $19.00 from: NARUC, P.O. Box 684, Washington, DC 20044.

Twelve Most Expensive Companies

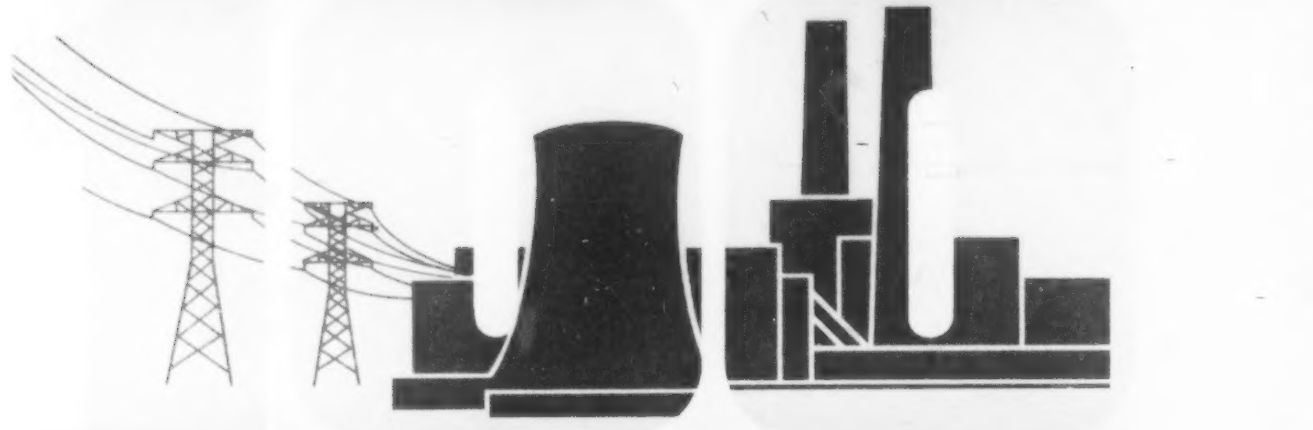
Company Name	State	Avg. Cost Cents 500 kWh	Summer '89 Rank
Commonwealth Edison Co.	Illinois	$0.143	1
Consolidated Edison Co. of N.Y.	New York	$0.142	2
Long Island Lighting Co.	New York	$0.140	3
Philadelphia Electric Co.	Pennsylvania	$0.129	4
Orange & Rockland Utilities, Inc.	New York	$0.127	5
Hawaii Electric Light Co.	Hawaii	$0.124	6
Toledo Edison	Ohio	$0.124	7
Cleveland Elec. Illuminating	Ohio	$0.123	8
Kauai Electric Co.	Hawaii	$0.121	9
Nantucket Electric Company	Massachusetts	$0.118	10
Duquesne Light Co.	Pennsylvania	$0.117	11
Commonwealth Electric Co.	Massachusetts	$0.116	12

Twelve Least Expensive Companies

Company Name	State	Avg. Cost Cents 500 kWh	Summer '89 Rank
Washington Water Power Co.	Idaho	$0.042	187
Washington Water Power Co.	Washington	$0.043	186
Pacific Power & Light Co.	Washington	$0.043	185
Idaho Power Co.	Idaho	$0.047	184
Idaho Power Co.	Oregon	$0.048	183
Montana Power Co.	Montana	$0.048	182
Kentucky Utilities Co.	Kentucky	$0.049	181
Portland General Electric Co.	Oregon	$0.051	180
Puget Sound Power & Light Co.	Washington	$0.051	179
Minnesota Power & Light Co.	Minnesota	$0.052	178
Edison Sault Electric Co.	Michigan	$0.053	177
Citizens Utilities Company	Vermont	$0.055	176

Source: NARUC 1989 Summer Survey of Residential Electric Bills

THE TOP 100 ELECTRIC UTILITIES



1989 OPERATING PERFORMANCES

Henry Stein
Senior Editor—Generation

BARRINGTON, IL—The *EL&P* Top 100 electric utilities saw their fuel usage go up in all categories in 1989 compared to 1988's (Table 1) and their average peak demand go up by a little over 4 percent (Table 2). Reflecting this trend, to hardly anyone's surprise, total energy usage in the United States kept on climbing last year—to 81.3 quads, according to a compilation made by by the American Council for an Energy-Efficient Economy, the Alliance to Save Energy and the Energy Conservation Coalition.

On the other hand, total energy use per dollar of gross national product (GNP) declined 1.5 percent, energy use per dollar of industrial value added declined 1.5 percent, use per service worker also declined slightly, and energy consumption per household held steady (also as compiled by the three groups mentioned in the previous paragraph).

More growth ahead

The Energy Information Administration (EIA) expects sales of electricity in the U.S. to grow by 2.3 percent per year between 1989 and 2010, reaching 4300 TWh (terawatthours—billion kilowatthours) by the end of the time period.

EIA says the largest growth will be in the commercial and industrial sectors, with slower growth in the residential area. Slowed growth in residential will be due to a slowdown in new home construction in the country and improved thermal efficiencies in new and existing structures.

The North American Electric Reliability Council's (NERC) advance release of its "1990 Electricity Supply & Demand for 1990-1999" notes that last *summer's* peak demand was 1.1 percent less than 1988's, but was 0.3 percent above the 1989 forecast. The '89 moderate summer was the reason for the demand decline, NERC says.

However, the 1989/90 *winter* peak demand in Canada exceeded the previous winter's peak by 2.7 percent. And the 1989 annual net energy for loads for both the U.S. and Canada were over their '88 actual figures and '89 forecasts.

Adding to energy concerns, this year's projections of electric energy peak demand by its members for the next 10 years have been raised by an additional 1.8 percent per year in the United States and by 2.9 percent per year in Canada when compared to last year's 10-year projections.

Margins—different sources/signals

The *EL&P* Top 100 reported their '89 average margin *increased* from 17.7 percent in '88 to 19.3 percent in '89, which works out to about a 29.7 GW addition last year.

However, the worrisome trend of declining estimated capacity margins continues apace (Fig. 1), according to the Edison Electric Institute (EEI). NERC concurs, saying, for instance, that in its East Central Area region, the projected summer capacity margin declined to a low 17.4 percent for this summer and is heading for an uncomfortable 15.5 percent by 1999.

In the Southeastern region, which is the region with the lowest margin, NERC estimates the winter capacity margin will be 22.4 percent for 1990/91 and will go down to a still-healthy 20.2 percent there by 1999. However, some of NERC's subregions, such as Florida (15.7 percent for 90/91), do not have such comfortable numbers for the coming winter.

Also, as previously noted (*EL&P*, June, p.54), the utility industry estimates that its new supplies will not meet projected demands and will fall short by the year 2000. When the total of utility and non-utility planned capacity additions are compared to estimated growth of demand, the trend shows up more clearly (Fig. 2). The situation does not look much better for the period after the turn of the century, either.

Not just new generation, T&D

Looking to make use of all avenues for meeting the energy supply situation, almost all utilities have started demand-side management programs. Many of them are attempting to reduce peak demand by encouraging customers to use electricity more efficiently or to use it during off-hours when overall demand is lighter.

One popular method is for a utility to offer its customers rebates if they allow their air conditioning to be automatically switched off for short periods on hot summer afternoons. A usual time period for shutoff is 10 minutes every hour.

Edison Electric Institute also notes that a growing number of utilities are implementing time-of-day pricing that reflects the electricity demand and production costs. The goal here is to spread demand over all hours of the day to make better use of expensive generating equipment.

The institute says that both governments and environmentalists are supporting their utilities in these endeavors.

Overall comparisons

Comparing '89 and '88 from another perspective, the Top 100 reported:

- They increased generating capacity by 6.4 percent.
- Their coal usage went up by 8.9 percent (Table 1), and nuclear capacity increased 6.4 percent (Table 3).
- Natural gas consumption jumped by 21.8 percent.
- Oil usage surged by 46.7 percent.

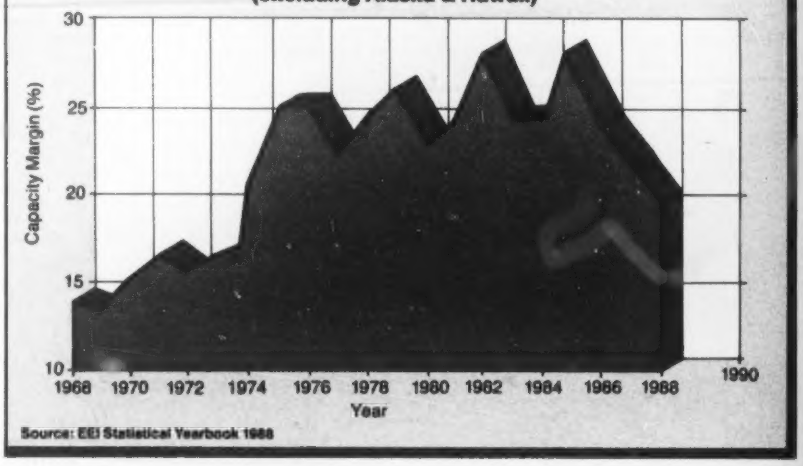
For comparison, EEI said:

- The electric utility industry as a whole increased its generation by 2.8 percent. (The EIA number is 2.6 percent, a close match.)
- Coal's share of this total decreased from 57.0 percent to 55.8 percent,—while nuclear's went down from 19.5 percent to 19.0 percent.
- Hydroelectric power took up some of the slack, increasing its percentage in '89 to 9.5 percent.
- Natural gas took 9.5 percent of the total.
- Oil-fired units equalled 5.7 percent.

EEI also said electric energy sales to ultimate customers totalled approximately 2600 TWh in 1989, an increase over 1988 of 2.3 percent. This sales rise was from an installed generating capacity that increased a measly 0.9 percent in 1989 to total 730.5 GW as of Dec. 31.

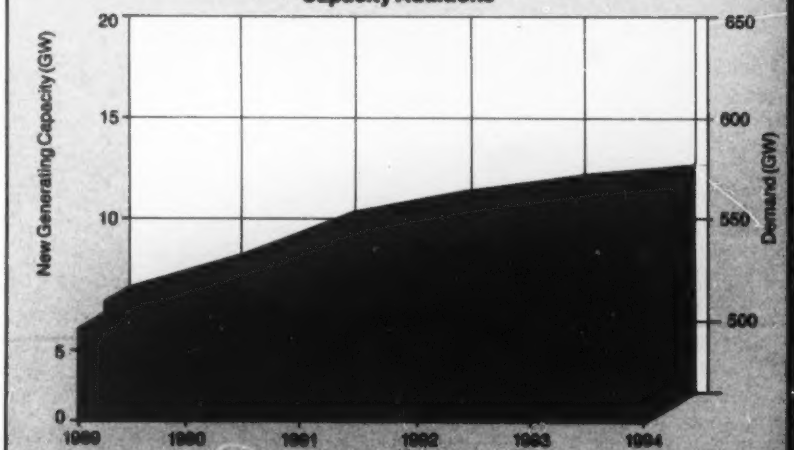
All this power went to approximately 108-million ultimate customers (again, as of Dec. 31, 1989). About 88 percent of these were in the residential sector.

Figure 1. Total U.S. Electric Capacity Margins (excluding Alaska & Hawaii)



Source: EEI Statistical Yearbook 1988

Figure 2. Forecast Summer Peak Demands vs. Planned Generating Capacity Additions



Sources: UDI Utility Data Base
NERC 1990 Electricity Supply & Demand for 1990-1999

(The number of residential customers went up by 1.5 percent in '89.)

To not quite keep up with demand, investor-owned utilities (IOUs) by themselves increased their spending 4.3 percent to $111.7 billion, said EEI in its "Advance Release of Data for the 1989 Statistical Yearbook of the Electric Utility Industry." Of this outlay, fuel represented 29.0 percent, which was a decrease from the '88 portion of 29.3 percent.

IOUs alone spent $23.8 billion in '89 for construction, up from $23.6 billion the year before.

However, EIA notes that all utilities expect to buy over 300 TWh from non-utility sources by 2010, which will be equivalent to 8 percent of total electricity sales.

Cogens & IPPs, a growing force

Much of the interest in actual capacity growth concentrated on what the cogenerators and independent power producers were doing. The most recent data from the Utility Data Institute (UDI) points out that more than 67 Twh (net) were purchased from cogenerators and IPPs that were in UDI's database in 1988, which was a large increase from the 47 TWh bought from them in 1987 and the 36 TWh of 1986.

(UDI also interpreted figures in the *EEI Statistical Yearbook/1988* and concluded that EEI had determined all utilities had received 52.6 TWh from cogenerators and IPPs in 1987 and 71.5 TWh in 1988.)

The three large IOUs in California purchased 23.7 TWh in 1988 from cogens and IPPs, and five utilities in Texas bought 22.5 TWh from them. Other states where large amounts of cogen-IPP power were bought in 1988 included North Carolina (at 3.09 TWh), Pennsylvania (3.09 TWh) and Virginia (2.54 TWh).

Perhaps that is why EIA estimates that through the year 2000 most new capacity will be gas-fired combined-cycle plants and simple-cycle combustion turbines.

This situation could bring problems of its own. Natural gas consumption in the U.S. could expand by 20-30 percent by 2000, notes EIA in its "Annual Energy Outlook 1990." The expansion could result in a doubling of net gas imports.

After 2000, it is felt that coal-fired plants "will dominate new capacity additions," in the U.S.

But EIA says King Coal will continue to dominate the electric utility industry here. It predicts coal demand will probably grow at 2.1 percent annually—more than any other fuel.

Renewables...?

The agency also predicts growth in renewable energy generation until it accounts for 9 percent of the total energy

TABLE 1.
FOSSIL FUEL CONSUMPTION

	1988	Change	1989	Change
Coal (million tons)	529	-26.4%	576	+8.9%
Oil (million bbl)	226	+24.3%	332	+46.7%
Gas (billion cu ft)	2,264	+3.9%	2,758	+21.8%

TABLE 6. HEAT RATES AND FUEL CONSUMPTION

Company	Rank	Heat Rate (Btu/kWh)	Up or Down	Coal (1000 tons)	Oil (1000 bbl)	Gas (1000 MCF)	Percent Change In Coal	Percent Change In Oil	Percent Change In Gas
United Illuminating	1	9,568	D	853	6,065	2,141	-1	-2	4879
Commonwealth Energy System*	2	9,601	U	0	8,034	2,632	0	0	14
American Electric Power*	3	9,851	D	44,990	565	0	7	0	0
Cincinnati Gas & Electric	4	9,900	D	8,583	124	148	2	182	-28
New York State Electric & Gas	5	9,931	U	6,472	25	0	6	-11	0
Southwestern Public Service	6	9,939	D	8,152	29	36,815	3	867	30
DPL*	7	9,939	D	5,674	17	86	-5	NA	NA
Detroit Edison	8	9,940	D	18,276	1,184	16,093	-1	9	23
Allegheny Power System*	9	9,967	U	17,107	0	0	2	0	0
New England Electric*	10	10,000	U	3,549	8,662	2,147	NA	NA	NA
Duke Power	11	10,013	D	9,791	176	350	11	17	-19
Potomac Electric Power	12	10,037	U	6,982	6,349	11,215	1	39	615
CMS Energy*	13	10,047	U	6,525	1,071	382	-2	-8	40
Centerior Energy*	14	10,075	NA	29,397	122,043	456,778	NA	NA	NA
Green Mountain Power	15	10,075	D	29[1]	122	457	83	0	4
Florida Progress* (FPC)	16	10,076	U	5,626	13,002	5,379	-4	60	117
Southern Company*	17	10,077	D	43,505	240	16,143	1	-47	99
Cilcorp*	18	10,110	U	2,169	0	19	-2	0	-39
Public Service of Indiana	19	10,124	D	11,484	9	0	7	NA	0
Central Hudson Gas & Electric	20	10,150	U	874	5,065	4,813	-1	38	116
Idaho Power	21	10,157	D	3,145	4	0	-1	300	NA
Union Electric	22	10,182	D	10,728	36	390	-2	-29	-28
TECO Energy*	23	10,207	U	6,759	124	0	-2	70	0
DQE*	24	10,213	D	4,653	60	173	2	-6	-16
Dominion Resources*	25	10,221	D	11,060	6,658	3,738	9	56	245
Pennsylvania Power & Light	26	10,264	D	460	6,548	0	-3	-7	0
Pacific Gas & Electric	27	10,304	NA	0	4,911	226,312	NA	NA	NA
Boston Edison	28	10,309	U	0	9,990	36,890	0	-19	296
SCANA Corporation* (SCE&G)	29	10,335	U	4,509	21	2,078	0	163	17
Orange & Rockland Utilities	30	10,362	U	589	2,128	12,859	30	12	9
Niagara Mohawk Power	31	10,376	U	3,499	10,414	27,848	14	-13	130
Southern California Edison	32	10,377	D	5,090	5,379	183,837	-12	18	8
Carolina Power & Light	33	10,418	D	9,726	169	7,179	9	177	70
Central Illinois Public Service	34	10,425	D	4,624	19	0	3	-57	0
Kentucky Utilities	35	10,428	U	5,491	2	0	-10	-100	0
General Public Utilities*	36	10,440	U	7,820	2,543	16,447	5	23	1
Midwest Energy*	37	10,457	U	2,512	196	285	24	3163	-83
Pacificorp	38	10,458	D	22,337	106	621	58	61	0
IPALCO Enterprises*	39	10,466	U	5,587	49	0	-5	-31	0
Central & South West*	40	10,474	U	16,178	359	217,999	2	354	11
Eastern Utilities Associates*	41	10,478	-	519	2,853	77	10	-51	NA
Houston Industries*	42	10,489	D	17,457	466	240,124	13	16	-11
Gulf States Utilities	43	10,490	U	1,959	20	163,171	0	-93	5
Louisville Gas & Electric	44	10,500	U	4,460	0	103	11	0	-53
Wisconsin Power & Light	45	10,506	U	3,568	20	230	-2	-9	-37
FPL Group* (FP&L)	46	10,523	U	652	25,998	131,147	18	-1	37
Iowa Southern*	47	10,530	D	1,492	6	0	7	-65	0
Illinois Power	48	10,538	U	6,512	193	781	-4	21	6
Baltimore Gas & Electric	49	10,543	U	4,731	5,681	7,843	0	134	123
Consolidated Edison	50	10,546	U	0	29,129	91,576	0	20	12
Atlantic Energy*	51	10,553	U	1,106	1,478	2,750	-2	3	257
Sierra Pacific Power	52	10,610	U	867	358	15,472	-4	-52	266
Ohio Edison	53	10,611	U	11,608	32	0	0	NA	-100
Portland General*	54	10,623	U	1,696	75	12,784	12	0	0
Northern Indiana Public Service	55	10,634	U	6,620	0	3,594	6	-100	22
Kansas City Power & Light	56	10,634	D	5,695	60	194	-4	-19	5
Public Service Enterprise Group*	57	10,635	U	4,348	5,973	37,990	9	1	7
St. Joseph Light & Power Co.	58	10,637	D	623	19	154	NA	NA	NA
Central Louisiana Electric	59	10,648	U	2,071	22	29,079	-7	0	12
Oklahoma Gas & Electric	60	10,652	D	6,392	29	93,114	0	109	-1
Iowa Resources*	61	10,657	D	2,677	26	289	36	160	-60
Rochester Gas & Electric	62	10,667	U	826	823	761	24	-12	2523
Public Service of Colorado	63	10,667	D	6,910	50	4,221	5	79	-99
Hawaiian Electric*	64	10,685	U	0	13,196	0	0	5	0
Central Maine Power	65	10,716	U	0	3,551	0	0	18	0
Northern States Power	66	10,719	-	11,639	82	1,457	7	-44	-38
Pinnacle West Capital*	67	10,739	U	7,190	55	19,831	19	NA	235
Southern Indiana Gas & Electric	68	10,767	D	2,530	0	180	-1	0	-15
Wisconsin Public Service	69	10,771	U	3,466	18	717	-1	-25	28
Entergy Corp.*	70	10,777	D	6,876	1,850	180,953	-10	17	-1
Tucson Electric Power	71	10,789	D	2,410	1	1,791	7	0	-21
El Paso Electric	72	10,790	U	400	25	31,130	-7	0	60
Montana Power*	73	10,815	D	3,993	14	327	-3	-48	18
Kansas Gas & Electric	74	10,818	D	2,766	17	9,473	-7	NA	20
Philadelphia Electric	75	10,880	U	3,079	5,949	2,209	-2	19	NA
Minnesota Power	76	10,916	D	3,830	0	0	-7	0	0
Iowa-Illinois Gas & Electric	77	10,930	U	2,602	9	300	-2	0	-42
Puget Sound Power & Light	78	10,952	D	3,481	178	7,751	NA	NA	NA
Commonwealth Edison	79	10,975	D	8,473	1,356	985	-17	-31	-14
Public Service of New Mexico	80	10,980	D	3,926	3	439	13	-99	42
Texas Utilities*	81	10,992	U	31,082	2,616	354,234	5	353	-2
Utilicorp United	82	11,082	U	1,488	160	88	-5	515	-55
Nevada Power	83	11,120	U	2,532	305	5,667	-1	51	22
Madison Gas & Electric	84	11,127	U	756	2	472	-5	-50	-19
Interstate Power	85	11,212	D	2,003	10	762	1	-29	-71
IE Industries*	86	11,294	D	865	16	NA	-21	-20	NA
Central Vermont Public Service	87	11,336	U	54[1]	73	11	73	19	0
KPL Gas Service	88	11,367	U	6,219	59	1,700	-1	393	-32
Empire District Electric	89	11,501	U	7,970	23	147	341	28	116
Otter Tail Power	90	11,738	U	2,082	1,953	0	4	13	0
MDU Resources Group, Inc.	91	12,291	U	1,636	8	13	NA	NA	NA
Centel*	92	12,437	-	881	10	4,028	0	11	-8
Washington Water Power*	93	NA	NA	1,816	9	46	1	29	820
Delmarva Power & Light	94	NA	NA	2,495	4,152	5,856	-10	-6	102
TNP Enterprises* (Tex-NM Power)	95	NA	NA	0	0	8	0	0	33
Public Service of New Hampshire	96	INFORMATION NOT PROVIDED BY COMPANY							
San Diego Gas & Electric	97	INFORMATION NOT PROVIDED BY COMPANY							
Northeast Utilities*	98	INFORMATION NOT PROVIDED BY COMPANY							
Wisconsin Energy*	99	INFORMATION NOT PROVIDED BY COMPANY							
Long Island Lighting	100	INFORMATION NOT PROVIDED BY COMPANY							

*Holding company
NA - Not Available

[1] Wood, not coal

0 (in change columns) - Less than 1% change and/or zero amounts in both years

TABLE 7. PEAK DEMAND AND CAPABILITY

Company	Season Peak (MW)	Change (%)	Winter (W) or Summer (S)	Total System Capacity at Time of Peak (MW)	Total System Reserve (%)	Owned Capacity At Peak (MW)	Owned Reserve (%)	Load Factor (%)
Allegheny Power System*	6,489	7.3	W	7,798	20	7,906	22	67.0
American Electric Power*	17,700	3.1	W	23,950	35	23,849	35	64.2
Atlantic Energy*	1,700	3.9	S	1,880	11	1,528	-10	56.1
Baltimore Gas & Electric	5,314	-1.2	S	6,164	16	5,461	3	57.4
Boston Edison	2,626	0.0	S	NA	NA	NA	NA	61.4
Carolina Power & Light	7,814	-3.3	S	9,584	23	9,014	15	59.8
Centel*	INFORMATION NOT PROVIDED BY COMPANY							
Centerior Energy*	5,428	NA	S	6,590	21	6,590	21	64.0
Central Hudson Gas & Electric	888	-0.3	S	1,074	21	1,102	24	65.6
Central Illinois Public Service	1,586	-8.0	S	2,439	54	2,637	66	58.2
Central Louisiana Electric	1,148	2.2	S	1,706	49	1,686	47	53.9
Central Maine Power	1,545	6.3	W	1,875	21	1,067	-31	72.2
Central Vermont Public Service	410	2.5	W	493	20	101	-75	65.9
Central & South West*	10,008	-1.3	S	13,843	38	13,537	35	58.4
Cilcorp*	1,075	-4.0	S	1,136	6	1,136	6	55.1
Cincinnati Gas & Electric	3,930	-1.7	S	4,354	11	4,054	3	57.3
CMS Energy*	5,753	-2.0	S	6,455	12	6,416	12	64.0
Commonwealth Edison	16,785	-3.9	S	22,506	34	22,521	34	52.6
Commonwealth Energy System*	919	1.3	W	1,032	12	225	-76	NA
Consolidated Edison	8,585	-0.4	S	10,543	23	9,239	8	51.6
Delmarva Power & Light	2,216	0.5	W	2,498	13	2,498	13	59.5
Detroit Edison	8,704	-4.7	S	9,942	14	9,878	13	57.3
Dominion Resources*	12,697	8.0	W	12,814	1	12,082	-5	55.4
DPL*	2,556	-1.1	S	2,652	4	2,652	4	59.7
Duke Power	13,611	-0.1	S	16,126	18	15,840	16	61.8
DQE*	2,381	4.4	S	2,800	18	2,790	17	59.6
Eastern Utilities Associates*	831	2.2	S	986	19	571	-31	59.9
El Paso Electric	1,076	7.4	S	1,498	39	773	-28	67.0
Empire District Electric	638	2.2	W	801	26	711	11	52.2
Entergy Corp.*	11,485	0.4	S	15,471	35	15,684	37	59.1
Florida Progress* (FPC)	5,832	-5.8	S	5,970	2	5,997	3	46.6
FPL Group* (FP&L)	13,988	13.0	S	11,163	-20	13,629	-3	57.1
General Public Utilities*	7,711	-3.5	S	8,985	17	6,865	-11	NA
Green Mountain Power	INFORMATION NOT PROVIDED BY COMPANY							
Gulf States Utilities	5,040	2.6	S	6,541	30	6,438	28	66.4
Hawaiian Electric*	1,359	2.8	W	1,605	18	1,558	15	72.0
Houston Industries*	10,456	0.3	S	14,464	38	13,644	30	61.0
Idaho Power	2,327	7.7	W	2,583	11	2,683	15	61.0
IE Industries*	991	-5.5	S	1,223	23	1,053	6	55.9
Illinois Power	3,245	-14.0	S	3,915	21	3,913	21	55.7
Interstate Power	896	-2.5	S	1,089	22	951	6	59.6
Iowa Resources*	1,358	-1.1	S	1,622	19	1,142	-16	46.8
Iowa Southern*	495	-3.5	S	600	21	601	21	54.7
Iowa-Illinois Gas & Electric	1,053	-2.3	S	1,297	23	1,392	32	52.0
IPALCO Enterprises*	2,387	-3.6	S	2,845	19	2,845	19	57.6
Kansas City Power & Light	2,541	-4.3	S	3,025	19	3,025	19	49.0
Kansas Gas & Electric	1,559	-5.9	S	2,425	56	2,434	56	56.0
Kentucky Utilities	2,919	5.5	W	3,417	17	3,158	8	53.9
KPL Gas Service	1,933	-4.8	S	2,434	NA	2,589	34	51.0
Long Island Lighting	INFORMATION NOT PROVIDED BY COMPANY							
Louisville Gas & Electric	2,022	-5.6	S	2,293	13	2,293	13	53.6
Madison Gas & Electric	513	7.5	S	579	13	594	16	52.0
MDU Resources Group, Inc.	384	-0.8	S	453	18	412	7	54.0
Midwest Energy*	985	1.7	S	1,139	16	1,189	21	48.6
Minnesota Power	1,287	9.0	W	1,559	21	1,274	-1	79.0
Montana Power*	1,420	-25.3	W	1,399	-1	1,207	-15	70.0
Nevada Power	2,092	11.1	S	2,304	10	1,741	-17	48.6
New England Electric*	4,225	2.9	S	5,223	24	3,915	-7	65.0
New York State Electric & Gas	2,597	0.9	W	3,061	18	2,680	3	64.7
Niagara Mohawk Power	6,376	2.5	W	7,574	19	5,614	-12	66.4
Northeast Utilities*	INFORMATION NOT PROVIDED BY COMPANY							
Northern Indiana Public Service	2,451	-0.2	S	3,396	39	3,396	39	63.4
Northern States Power	6,534	-5.6	S	7,783	19	6,848	5	58.1
Ohio Edison	5,152	2.5	S	6,157	20	6,157	20	67.8
Oklahoma Gas & Electric	4,248	-4.0	S	5,703	34	5,703	34	50.0
Orange & Rockland Utilities	941	-3.1	S	1,151	22	1,020	8	52.4
Otter Tail Power	588	6.7	W	708	20	600	2	58.5
Pacific Gas & Electric	15,065	NA	S	22,100	47	17,210	14	62.7
Pacificorp	6,875	62.1	W	8,216	20	6,814	-1	86.0
Pennsylvania Power & Light	6,000	7.8	W	7,864	31	8,329	39	59.5
Philadelphia Electric	6,467	-5.3	S	5,802	-10	7,759	20	60.5
Pinnacle West Capital*	3,603	8.0	S	350	-90	4,274	19	55.7
Portland General*	3,519	21.6	W	4,204	19	2,721	-23	51.9
Potomac Electric Power	5,241	0.6	S	5,825	11	5,375	3	54.7
Public Service Enterprise Group*	8,324	-4.8	S	9,936	19	10,092	21	55.0
Public Service of Colorado	3,484	3.6	S	4,051	16	2,729	-22	69.8
Public Service of Indiana	4,272	-2.9	W	5,921	39	5,687	33	59.0
Public Service of New Hampshire	INFORMATION NOT PROVIDED BY COMPANY							
Public Service of New Mexico	1,006	5.2	S	1,578	57	1,571	56	64.1
Puget Sound Power & Light	4,299	18.2	W	4,447	3	1,817	-58	49.0
Rochester Gas & Electric	1,249	-2.0	S	1,600	28	1,238	-1	62.4
San Diego Gas & Electric	INFORMATION NOT PROVIDED BY COMPANY							
SCANA Corporation* (SCE&G)	3,144	4.1	S	3,907	24	3,891	24	57.0
Sierra Pacific Power	922	1.5	W	1,191	29	836	-9	70.7
Southern California Edison	15,632	-2.2	S	20,531	31	14,077	-10	59.0
Southern Company*	24,399	3.2	S	28,789	18	29,807	22	58.6
Southern Indiana Gas & Electric	941	-8.1	S	1,167	24	1,167	24	65.4
Southwestern Public Service	3,019	6.7	S	4,251	41	4,051	34	64.5
St. Joseph Light & Power Co.	310	-4.0	S	381	23	356	15	51.8
TECO Energy*	2,712	3.5	W	2,936	8	3,142	16	57.7
Texas Utilities*	17,146	-2.7	S	20,448	19	18,369	7	58.1
TNP Enterprises* (Tex-NM Power)	INFORMATION NOT PROVIDED BY COMPANY							
Tucson Electric Power	1,304	6.0	S	1,286	-1	1,300	0	57.9
Union Electric	6,845	-1.9	S	7,934	16	7,516	10	54.1
United Illuminating	1,094	-3.3	S	1,290	18	1,237	13	58.5
Utilicorp United	INFORMATION NOT PROVIDED BY COMPANY							
Washington Water Power*	1,660	22.1	W	1,270	-23	1,132	-32	48.0
Wisconsin Energy*	INFORMATION NOT PROVIDED BY COMPANY							
Wisconsin Power & Light	1,777	-2.3	S	1,998	12	1,915	8	61.7
Wisconsin Public Service	1,504	-0.4	S	1,691	12	1,707	13	71.9

* Holding company NA - Not Available/Not Applicable

requirements in 2010. This growth will not be seen only in the electric utilities—they will use more hydropower—but industrial generators will use more heat from wood waste, and homes will utilize more wood for heating.

Heat rates improve once more

The median heat rate for the Top 100 in 1989 was 10,546 Btu/kWh, which compares favorably with 1988's median heat rate of 10,569 Btu/kWh. This 0.2-percent drop, although quite small, seems to indicate how seriously utilities were working to increase their efficiencies, especially since the '88 number had been higher than 1987's. This "blip" up in '88 had itself reversed the previous five-year trend of lower median heat rates from year-to-year.

Among the Top 100 (Table 6), there was some shifting of heat rate positions. United Illuminating Co. moved from No. 4 to the top spot, and Cincinnati Gas & Electric Co. improved its operations enough to jump from the No. 8 place to No. 4. But the largest leap among the top 10 in the list was by Southwestern Public Service Co., which moved up 15 places to become No. 6.

The individual generating unit operated more than 50 percent of the time that had the best heat rate was Central & South West Services Inc.'s Commanche Power Station (Table 4). Duke Power Co. not only grabbed the No. 2 spot in this list, but also claimed four more places in this list of the top 20 individual units with the best heat rates.

Not satisfied with this showing, Duke also held onto its No. 1 spot as the Top 100 utility with the best overall heat rate for conventional fossil-fueled boilers (Table 5).

American Electric Power Co. Inc. was no slouch in the top individual units department, claiming four positions in the top-20 listings. In terms of overall showing in this list, New England Electric System and Detroit Edison Co. came next, with two units apiece.

Peak demand keeps climbing

As mentioned near the beginning of this article, although peak demand on the Top 100 kept up its ascending trend, in general, they seemed to have the situation in hand (Tables 2 and 7). One company that appeared not to be doing so was Philadelphia Electric Co.,

TABLE 2. PEAK DEMAND AND RESERVE MARGINS

	1988	Change	1989	Change
Seasonal Peak (MW)	399,275	+5.2%	415,615	+4.1%
Total System Capability (MW)	465,982	+1.0%	495,659	+6.4%
System Reserve Margin	17.7%		19.3%	
Total Owned Capability (MW)	438,230	0.4%	466,245	+6.4%
Owned Reserve Margin	6.5%		12.2%	
Average Load Factor	58.7		58.6	

which had a large shortage of reserve margin. Washington Water Power Co. and FPL Group Inc. were in much more "comfortable" positions, but still had large negative reserves in '89.

The remainder of the reporting companies appeared to be fairly "comfortable," with reserve margins ranging from a close − 1 percent to a much more comfortable + 57 percent.

A sampling of reports from some utilities places some of the generalizations in perspective.

Hot weather in June 1989 hit the Pennsylvania-New Jersey-Maryland Power Pool (PJM) area hard at the same time a number of their generating units were finishing up scheduled outages. In addition, systems just south of PJM had serious capacity shortages, and imports from the west were cut to zero. So PJM implemented a 5-percent voltage reduction one day.

The next day, the power pool had to interrupt customers on curtailable rates, issue a voltage reduction warning, curtail non-essential use in the buildings of its 11 member utilities and ask industrial customers to voluntarily cut down their usage. These measures so slowed the load growth that no voltage reduction was necessary on the second day.

However, voltage reductions were needed on one day later in the month and in July.

In the spring of 1990, General Public Utilities Corp. issued a warning about the PJM power supply situation, but the utility claimed it anticipated no similar problems during the forthcoming summer. Still, its notice went on to delineate the various curtailment methods that might be implemented in case of severe shortages of capacity.

Gulf Power Co. reported in mid-June of this year that customers were demanding record amounts of electricity but that it felt confident it could meet the load. A new record of 1753 MW was set for the utility on June 19. This was 55 MW higher than the company's all-time previous summer record of 1698 MW.

A statement from the utility "encouraged" customers to not waste energy.

Kansas Gas & Electric Co. said that its customers' hourly electricity usage hit a record high on June 28 of 1.71 GWh This amount compared to the 1.68 GWh hourly record set Aug. 15, 1988, which was the utility's previous all-time high.

Then on July 2, the new record was surpassed by a usage of 1.73 GWh between 4:00 and 5:00 p.m.

TABLE 3.
TYPE OF GENERATION (MW)

Type	1988	Change	1989	Change
Conventional Steam	325,687	-1.4%	337,419	+3.6%
Nuclear	69,498	-1.6%	73,969	+6.4%
Combustion Turbine — Simple & Combined-Cycle	NA	NA	33,649	NA
Hydro & Pumped Storage	22,272	-1.5%	26,430	+18.7%
Other	0	+0.0%	4,339	NA
Total	417,457	-0.3%	475,805	+14.0%

TABLE 8. TYPE OF GENERATION IN THE SYSTEM

	Conventional Steam			Nuclear			Combustion Turbine**		Hydro & Pump Storage			Other	
Company	(MW)	(%)	Last Year Change (MW)	(MW)	(%)	Last Year Change (MW)	(MW)	(%)	(MW)	(%)	Last Year Change (MW)	(MW)	(%)
Allegheny Power System*	7,004	89	0	0	0	0	0	0	902	11	0	0	0
American Electric Power*	20,865	87	1326	2,130	9	0	18	0	836	4	48	0	0
Atlantic Energy*	787	52	-10	373	24	0	359	23	0	0	0	9	1
Baltimore Gas & Electric	3,108	57	-1633	1,650	30	0	719	13	0	0	0	3	0
Boston Edison	5,364	86	3558	667	11	0	208	3	0	0	0	0	0
Carolina Power & Light	5,102	57	34	2,676	30	0	1,018	11	218	2	0	0	0
Centel*	INFORMATION NOT PROVIDED BY COMPANY												
Centerior Energy*	4,390	66	NA	1,860	28	NA	135	2	305	5	NA	4	0
Central Hudson Gas & Electric	907	83	-1	97	9	0	38	3	43	4	0	5	0
Central Illinois Public Service	2,634	100	-43	0	0	0	0	0	0	0	0	3	0
Central Louisiana Electric	1,681	100	0	0	0	0	0	0	0	0	0	0	0
Central Maine Power	688	63	139	29	3	0	42	4	340	31	3	0	0
Central Vermont Public Service	22	19	0	20	17	0	29	25	42	36	1	2	2
Central & South West*	12,253	87	-392	630	4	315	522	4	0	0	0	725	5
Cilcorp*	1,106	97	0	0	0	0	30	3	0	0	0	0	0
Cincinnati Gas & Electric	3,579	88	-1	0	0	0	475	12	0	0	0	0	0
CMS Energy*	4,176	65	24	822	13	0	395	6	1,023	16	0	0	0
Commonwealth Edison	9,703	43	0	11,487	51	0	1,309	6	0	0	0	22	0
Commonwealth Energy System*	1,024	94	-3	0	0	0	48	4	0	0	0	17	2
Consolidated Edison	6,323	68	0	849	9	0	2,076	22	0	0	0	0	0
Delmarva Power & Light	1,794	72	6	321	13	0	361	14	0	0	0	23	1
Detroit Edison	7,458	76	3	971	10	58	378	4	917	9	0	147	1
Dominion Resources*	6,192	52	130	3,180	27	1	906	8	1,592	13	1	0	0
DPL*	2,469	93	10	0	0	0	149	6	0	0	0	34	1
Duke Power	6,735	43	307	7,054	45	0	599	4	1,452	9	0	0	0
DQE*	2,106	74	-16	663	23	-1	0	0	0	0	0	66	2
Eastern Utilities Associates*	509	85	1	46	8	0	0	0	0	0	0	47	8
El Paso Electric	828	55	0	602	40	0	69	5	0	0	0	0	0
Empire District Electric	435	64	0	0	0	0	228	34	16	2	0	0	0
Entergy Corp.*	12,108	73	0	3,797	23	1	528	3	70	0	0	33	0
Florida Progress* (FPC)	4,152	66	-43	692	11	4	1,445	23	0	0	0	0	0
FPL Group* (FP&L)	8,372	61	-69	2,885	21	0	2,344	17	0	0	0	28	0
General Public Utilities*	3,657	53	-33	1,428	21	-32	318	5	305	4	-2	1,160	17
Green Mountain Power	14	10	1	0	0	0	79	58	36	26	0	8	6
Gulf States Utilities	6,247	91	619	655	9	0	0	0	0	0	0	0	0
Hawaiian Electric*	1,278	82	14	0	0	0	129	8	0	0	0	152	10
Houston Industries*	11,434	84	-30	770	6	385	1,410	10	0	0	0	0	0
Idaho Power	992	36	1	0	0	0	50	2	1,731	62	-11	0	0
IE Industries*	518	49	168	368	35	18	161	15	0	0	0	6	1
Illinois Power	3,340	78	0	807	19	1	138	3	0	0	-2	0	0
Interstate Power	896	94	0	0	0	0	44	5	0	0	0	11	1
Iowa Resources*	867	76	13	0	0	0	275	24	0	0	0	0	0
Iowa Southern*	574	99	0	0	0	0	0	0	0	0	0	6	1
Iowa-Illinois Gas & Electric	907	65	0	385	28	0	97	7	3	0	0	0	0
IPALCO Enterprises*	2,755	97	-16	0	0	0	60	2	0	0	0	14	0
Kansas City Power & Light	2,105	70	30	533	18	3	387	13	0	0	0	0	0
Kansas Gas & Electric	1,897	78	1	534	22	4	0	0	0	0	0	3	0
Kentucky Utilities	3,075	97	-12	0	0	0	59	2	24	1	0	0	0
KPL Gas Service	2,250	87	58	0	0	0	339	13	0	0	0	0	0
Long Island Lighting	INFORMATION NOT PROVIDED BY COMPANY												
Louisville Gas & Electric	2,134	95	0	0	0	0	108	5	0	0	0	0	0
Madison Gas & Electric	424	67	15	95	15	2	115	18	0	0	0	0	0
MDU Resources Group, Inc.	359	86	8	0	0	0	60	14	0	0	0	0	0
Midwest Energy*	985	83	0	0	0	0	204	17	0	0	0	0	0
Minnesota Power	1,158	91	1	0	0	0	0	0	116	9	2	0	0
Montana Power*	899	63	-71	0	0	0	0	0	518	36	-2	5	0
Nevada Power	1,312	75	0	0	0	0	399	23	0	0	0	30	2
New England Electric*	2,620	66	3	141	4	0	0	0	1,162	29	2	57	1
New York State Electric & Gas	2,414	90	9	193	7	-1	0	0	65	2	-2	7	0
Niagara Mohawk Power	3,654	65	108	1,050	19	-4	230	4	680	12	4	0	0
Northeast Utilities*	INFORMATION NOT PROVIDED BY COMPANY												
Northern Indiana Public Service	3,145	93	0	0	0	0	241	7	10	0	0	0	0
Northern States Power	3,905	57	59	1,540	23	-9	1,127	17	255	4	29	0	0
Ohio Edison	4,647	78	0	1,187	20	2	113	2	0	0	0	26	0
Oklahoma Gas & Electric	5,645	99	1	0	0	0	59	1	0	0	0	0	0
Orange & Rockland Utilities	902	88	0	0	0	0	74	7	44	4	0	0	0
Otter Tail Power	535	85	1	0	0	0	87	14	4	1	0	0	0
Pacific Gas & Electric	7,213	49	NA	2,160	15	NA	418	3	3,723	25	NA	1,302	9
Pacificorp	6,110	84	2988	27	0	0	15	0	1,103	15	127	20	0
Pennsylvania Power & Light	5,785	69	-6035	1,890	23	0	486	6	146	2	0	22	0
Philadelphia Electric	2,769	36	0	2,883	37	0	804	10	1,290	17	0	13	0
Pinnacle West Capital*	2,095	53	-66	1,109	28	0	754	19	6	0	0	0	0
Portland General*	670	25	9	745	28	0	650	24	611	23	0	6	0
Potomac Electric Power	4,809	89	0	0	0	0	565	11	0	0	0	1	0
Public Service Enterprise Group*	4,329	43	0	2,807	28	0	2,786	28	165	2	0	5	0
Public Service of Colorado	2,474	90	17	0	0	-270	171	6	84	3	0	16	1
Public Service of Indiana	5,376	96	0	0	0	0	0	0	55	1	0	196	3
Public Service of New Hampshire	INFORMATION NOT PROVIDED BY COMPANY												
Public Service of New Mexico	1,181	74	0	390	25	0	20	1	0	0	0	0	0
Puget Sound Power & Light	858	46	1	0	0	0	699	37	310	17	1	3	0
Rochester Gas & Electric	541	44	0	621	50	0	29	2	47	4	0	0	0
San Diego Gas & Electric	INFORMATION NOT PROVIDED BY COMPANY												
SCANA Corporation* (SCE&G)	2,286	59	0	590	15	0	259	7	756	19	0	0	0
Sierra Pacific Power	742	89	0	0	0	0	37	4	7	1	0	50	6
Southern California Edison	8,769	62	1	2,541	18	0	1,614	11	1,153	8	-1	8	0
Southern Company*	22,565	76	1513	3,418	11	514	1,171	4	2,592	9	0	0	0
Southern Indiana Gas & Electric	1,028	88	-4	0	0	0	135	12	0	0	0	0	0
Southwestern Public Service	3,945	97	2865	0	0	0	92	2	0	0	0	14	0
St. Joseph Light & Power Co.	276	78	0	0	0	0	80	22	0	0	0	0	0
TECO Energy*	2,954	94	60	0	0	0	188	6	0	0	0	0	0
Texas Utilities*	17,804	97	0	0	0	0	585	3	0	0	0	0	0
TNP Enterprises* (Tex-NM Power)	39	78	1	0	0	0	11	22	0	0	0	0	0
Tucson Electric Power	1,113	84	0	0	0	0	218	16	0	0	0	0	0
Union Electric	5,307	71	-81	1,125	15	7	374	5	631	8	0	5	0
United Illuminating	1,121	95	1	43	4	0	0	0	0	0	0	22	2
Utilicorp United	652	69	23	0	0	0	295	31	0	0	0	0	0
Washington Water Power*	453	31	0	0	0	0	68	5	946	64	0	0	0
Wisconsin Energy*	INFORMATION NOT PROVIDED BY COMPANY												
Wisconsin Power & Light	1,463	77	-2	217	11	2	182	10	42	2	0	1	0
Wisconsin Public Service	1,277	75	7	219	13	3	153	9	54	3	0	4	0

* Holding company   ** Simple and Combined-Cycle   NA - Not Available/Not Applicable

	Transmission				Distribution							
					Overhead				Underground			
Company	Below 189 kV (circuit miles)	Miles Added	189 kV & Up (circuit miles)	Miles Added	Below 22 kV (pole miles)	Miles Added	22 kV & Up (pole miles)	Miles Added	Below 22 kV (cable miles)	Miles Added	22 kV & Up (cable miles)	Miles Added
Allegheny Power System*	3,456	7	1,107	0	50,133	390	4,610	37	3,833	321	22	6
American Electric Power*	15,795	0	5,926	0	92,905	497	5,897	306	7,280[2]	245[2]	577[2]	119[2]
Atlantic Energy*	1,194	26	64	1	8,967	2908	0	0	904	69	0	0
Baltimore Gas & Electric	658	10	495	6	NA	NA	732	0	NA	NA	350	-121
Boston Edison	200	NA	162	NA	4,611	NA	0	NA	7,523	NA	0	NA
Carolina Power & Light	3,110	-1	3,051	22	NA	NA	38,162	325	NA	NA	5,181	451
Centel*	NA	NA	NA	NA	NA	NA	6,684	-41	NA	NA	718	24
Centerior Energy*	1,994	NA	516	NA	16,531	NA	0	NA	6,806	NA	20	NA
Central Hudson Gas & Electric	526	0	76	0	6,438	35	46	0	931	49	0	0
Central Illinois Public Service	4,266	8	305	1	8,307	1	0	0	721	28	0	0
Central Louisiana Electric	801	35	363	10	0	0	10,795	103	0	0	276	14
Central Maine Power	2,024	13	208	1	17,249	222	324	29	875	218	12	0
Central Vermont Public Service	622	0	0	0	7,305	62	0	0	169	17	0	0
Central & South West*	14,017	4233	1,965	300	56,008	-1597	573	53	6,512	692	361	2
Cilcorp*	284	1	47	0	5,600	7	615	-1	1,767	38	7	1
Cincinnati Gas & Electric	1,323	-8	383	0	9,042	18	543	15	2,283	140	33	1
CMS Energy*	7,943	10	1,918	0	48,675	382	0	0	0	0	6,870	-48
Commonwealth Edison	2,446	4	2,552	-1	0	NA	36,091	57	0	NA	24,785	1309
Commonwealth Energy System*	300	5	61	0	3,730	-31	2,062	46	2,632	108	1,020	67
Consolidated Edison	22	0	409	0	25,400	34	505	17	58,578	164	6,818	-8
Delmarva Power & Light	1,127	4	263	0	1,816	21	4,768	-5	1,002	59	2,461	166
Detroit Edison	4,436	-6	1,030	57	30,291	169	0	0	8,350	327	0	0
Dominion Resources*	2,797	-71	3,096	96	NA	NA	37,214	165	NA	NA	16,453	893
DPL*	1,345	0	448	0	NA	NA	NA	NA	NA	NA	NA	NA
Duke Power	9,380	44	3,100	0	49,295	597	9,558	144	5,267	425	2,639	254
DQE*	513	1	148	0	5,743	-615	888	484	1,781	-437	1,029	603
Eastern Utilities Associates*	184	-2	178	0	890	4	3,285	777	265	15	829	10
El Paso Electric	711	30	840	52	3,170	32	1,505	49	841	28	137	10
Empire District Electric	1,257	9	22	1	4,909	59	0	0	250	5	0	0
Entergy Corp.*	7,206	7	3,046	69	67,185	455	4,749	-12	3,724	173	1,677	-27
Florida Progress* (FPC)	2,714	33	1,557	0	NA	NA	NA	NA	4,473	273	0	0
FPL Group* (FP&L)	2,256	1	3,293	4	NA	NA	36,532	569	NA	NA	14,503	885
General Public Utilities*	4,441	27	2,204	21	42,627	1495	5,367	-109	14,999	904	1,465	191
Green Mountain Power	281	0	0	0	2,258	22	20	1	310	36	7	1
Gulf States Utilities	3,144[1]	NA	1,034[1]	NA	18,264	125	1,407	12	1,773	26	115	6
Hawaiian Electric*	1,470	-5	0	0	4,018	74	0	0	2,478	54	0	0
Houston Industries*	2,504	7	1,032	2	18,154	96	1,457	31	4,427	-870	1,244	-88
Idaho Power	3,241[1]	167[1]	1,481[1]	0	12,998	-78	4,204	52	4,882	147	232	27
IE Industries*	3,193	-19	67	1	4,719	3	0	0	1,958	105	0	0
Illinois Power	2,321	0	484	0	16,774	119	1,331	1	1,210	56	4	0
Interstate Power	2,518	4	74	0	0	0	NA	NA	589	25	0	0
Iowa Resources*	1,115	2	345	0	11,538	179	0	0	2,711	165	0	0
Iowa Southern*	932	0	61	0	3,154	3	0	0	NA	NA	478	17
Iowa-Illinois Gas & Electric	632	-37	305	0	4,674	15	0	0	0	-1203	0	0
IPALCO Enterprises*	604	-4	454	0	4,687	8	0	0	4,854	264	0	0
Kansas City Power & Light	1,379	36	295	1	8,881	31	0	0	5,929	329	0	0
Kansas Gas & Electric	1,595	2	663	0	7,766	-9	0	0	2,241	95	0	0
Kentucky Utilities	4,268	-4	412	0	14,579	132	0	0	943	79	0	0
KPL Gas Service	3,610	10	791	1	12,616	82	0	0	1,305	798	0	0
Long Island Lighting	INFORMATION NOT PROVIDED BY COMPANY											
Louisville Gas & Electric	760	0	131	0	3,321	1	106	20	2,127	33	0	0
Madison Gas & Electric	178	-1	124	0	1,075	-2	0	0	826	153	0	0
MDU Resources Group, Inc.	2,831	0	319	0	2,824	-1	0	0	1,766	18	0	0
Midwest Energy*	2,146	1	184	0	0	0	0	0	NA	NA	NA	NA
Minnesota Power	1,541[1]	2[1]	607[1]	0	3,791	-1555	637	-3	998	31	4	-11
Montana Power*	5,564	17	1,445	0	12,996	33	0	0	0	0	0	NA
Nevada Power	568	17	638	0	2,943	61	0	0	3,876	419	0	0
New England Electric*	1,994	-7	684	51	16,818	116	763	-41	7,481	170	219	-2
New York State Electric & Gas	3,790	1	813	0	30,880	239	1,934	-39	0	0	0	0
Niagara Mohawk Power	8,065	5	1,126	0	0	NA	108,949	429	0	NA	7,896	224
Northeast Utilities*	INFORMATION NOT PROVIDED BY COMPANY											
Northern Indiana Public Service	2,659	6	332	0	7,636	2	0	0	876	78	0	0
Northern States Power	5,408	-66	1,460	-10	28,065	-33	0	0	12,044	330	0	0
Ohio Edison	4,893	-10	628	0	24,892	45	0	0	3,641	211	0	0
Oklahoma Gas & Electric	3,616	19	982	0	0	0	20,574	94	0	NA	5,803	96
Orange & Rockland Utilities	471	0	80	0	4,756	66	0	0	1,164	103	0	0
Otter Tail Power	4,863	8	411	1	0	NA	0	NA	0	NA	0	NA
Pacific Gas & Electric	INFORMATION NOT PROVIDED BY COMPANY											
Pacificorp	9,549	6006	5,565	2327	0	NA	44,153	15980	NA	NA	NA	NA
Pennsylvania Power & Light	0	0	1,308	0	49,424	521	2,397	-4	8,843	698	14	0
Philadelphia Electric	179	-158	767	23	12,224	394	61	0	17,337	637	17	0
Pinnacle West Capital*	2,358[1]	NA	2,419[1]	NA	10,731	38	0	NA	7,229	237	0	NA
Portland General*	933[1]	NA	1,038[1]	NA	8,769	796	0	0	5,319[3]	192[3]	0	0
Potomac Electric Power	26	0	783	0	4,511	-4	328	9	11,118	358	792	8
Public Service Enterprise Group*	283	13	814	92	NA	NA	47	0	27,339	1397	2,691	58
Public Service of Colorado	1,587	-19	1,373	58	11,490	-32	1,521	25	5,649	226	247	16
Public Service of Indiana	4,005	9	1,392	-2	18,250	17	0	0	2,872	307	0	-9
Public Service of New Hampshire	INFORMATION NOT PROVIDED BY COMPANY											
Public Service of New Mexico	888	0	1,896	0	4,734	27	0	-4707	2,393	65	0	0
Puget Sound Power & Light	1,849[1]	-4[1]	401[1]	179[1]	10,185	189	137	-7	4,967	421	24	4
Rochester Gas & Electric	705	-1	0	0	6,719	-10	0	0	4,152	-26	0	0
San Diego Gas & Electric	INFORMATION NOT PROVIDED BY COMPANY											
SCANA Corporation* (SCE&G)	2,412	3	788	0	6,322	94	7,753	132	112	NA	94	NA
Sierra Pacific Power	2,705	-781	914	914	6,810	6810	1,318	-6639	668	668	2,491	-523
Southern California Edison	6,594	13	5,326	0	NA	NA	44,816	136	53,496	3136	190	71
Southern Company*	19,953	58	6,340	-20	NA	NA	93,754	1506	NA	NA	19,596	2257
Southern Indiana Gas & Electric	859	-1	0	0	3,176	-1	0	0	835	37	0	0
Southwestern Public Service	4,022	2	1,515	1	NA	NA	NA	NA	NA	NA	NA	NA
St. Joseph Light & Power Co.	415	0	117	0	2,178	13	0	0	140	7	0	0
TECO Energy*	800	-4	357	3	6,687	43	0	0	2,068	102	0	0
Texas Utilities*	8,936	62	3,836	2	48,248	54	4,698	555	8,102	-128	2,225	269
TNP Enterprises* (Tex-NM Power)	1,248[1]	-1,306[1]	76[1]	36[1]	8,955	547	0	0	483	14	0	0
Tucson Electric Power	325	0	1,504	0	7,361	214	486	-35	3,314	97	0	0
Union Electric	2,202	1	988	0	20,611	126	4,007	7	9,342	349	359	1
United Illuminating	91	0	6	0	3,077	13	0	0	1,096	13	2	0
Utilicorp United	1,247[1]	18[1]	58[1]	0	6,637	-80	104	0	755	35	0	0
Washington Water Power*	1,507[1]	0	657[1]	0	8,686	0	588	0	1,430	0	0	0
Wisconsin Energy*	INFORMATION NOT PROVIDED BY COMPANY											
Wisconsin Power & Light	2,683	45	107	1	16,872	31	0	0	1,347	80	0	0
Wisconsin Public Service	1,492	-36	124	0	NA	NA	19,532	37	NA	NA	1,929	163

*Holding company

NA - Not Available/Not Applicable

[1] Pole Miles

[2] Circuit Miles

[3] Conduit Bank Miles

KG&E also said that 33.08 GWh was used on July 2, a new record for a single day. The company met all these needs.

Another record was broken by Dayton Power & Light Co., which reported an all-time peak level of usage of 2.60 GW at 2:00 p.m. on July 9 by the people in the Miami Valley. It exceeded the previous level of 2.59 GW set on Aug. 17, 1988. The utility met the load called for.

Generation changes

There were no great surprises in the amounts and types of generation utilized by the *EL&P* Top 100 (Table 8).

The largest increase over 1988 reported was in the hydro and pumped storage category, where the Top 100 increased their aggregate capacity 18.7 percent to 26,430 MW (Table 3).

Three utilities accounted for the major portion of this increase—PacifiCorp (127 MW added in '89), American Electric Power (48 MW added) and Northern States Power Co. (29 MW added).

Few companies reduced their dependence on hydro power and pumped storage.

Overall coal consumption reached 990-million tons in 1989, reported the National Coal Association. However, this amount included exports.

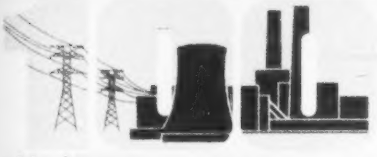
The NCA also estimated that electric utility consumption was projected to increase by 7-million tons over the 1989 level to 773-million tons. But the association admits coal's share of this market will probably decline slightly in 1990 to 55.5 percent. It attributes this decline to an increase in nuclear generation and in hydro power.

Only two new coal-fired power plants came online in 1989, adding up to 1667 MW of fresh capacity. But four new plants were expected onstream in 1990.

Nuclear energy accounted for some

TABLE 4.
TOP GENERATING UNITS BY HEAT RATE (capac. factor > 50%)

Rank & Unit	Capacity (MW)	Utility	Heat Rate (Btu/ kWh)
1. Commanche Power St	260	Central & South West	8,831
2. Marshall -4	660	Duke Power	9,044
3. Canal Plant -1	572	Commonwealth Energy System	9,057
4. Belews Creek -2	1,120	Duke Power	9,074
5. Brayton Point -3	622	New England Electric	9,080
6. Marshall -3	660	Duke Power	9,112
7. Conemaugh -2	33	Jointly Owned	9,159
8. Belews Creek -1	1,120	Duke Power	9,186
9. Cardinal -1	600	American Electric Power	9,189
10. Morgantown -2	582	Potomac Electric Power	9,228
11. Somerset -1	686	New York State Electric & Gas	9,229
12. J H Campbell -3	719	CMS Energy	9,248
13. Monroe -1	750	Detroit Edison	9,262
14. Amos -2	800	American Electric Power	9,279
15. Fort Martin -2	555	Allegheny Power System	9,281
16. Brayton Point -2	253	New England Electric	9,308
17. Amos -1	800	American Electric Power	9,316
18. Clinch River -2	235	American Electric Power	9,327
19. Trenton Channel -9	500	Detroit Edison	9,343
20. Marshall -1	385	Duke Power	9,355



19 percent of the energy produced in the U.S. in 1989, with a capacity of approximately 98,000 MW. This was by far the most power gotten from the atom of any country. If the Seabrook and Shoreham plants had not been placed in such difficulties, this nuclear capacity could have been higher.

Perhaps the streamlining of the licensing process by the Nuclear Regulatory Commission will help get nuclear units up and running faster and more easily in the future.

Another hope is for the advanced, passive, light-water, modular plants being designed by Westinghouse Electric Co. and General Electric Co. The plants also should help add to the speed and ease of bringing on new nuclear capacity. If these plants truly are standardized, as the CANDUs are in Canada, licensing could be less dependent on and less delayed by some of today's "roadblocks." This, in turn, could lead to much less costly plants and lower the price of the electricity they produce.

Gas-cooled reactors also are under development that hold out the promise of failsafe operation. Supposedly, one of these would be able to withstand simulataneous failure of the reactor's control rods and its cooling system.

Since combustion turbines were not broken out into a separate category in last year's report, the increase in their use cannot be listed this year. However, next year's report should show how this interesting class of generation is trending.

Type of T&D still key to trends

Transmission and distribution figures reported were a "mixed bag" (Table 9). Overall, among the *EL&P* Top 100, transmission miles were almost universally more than in 1988. Few utilities reduced their total transmission line mileages.

But many increased their installed base, such as Central & South West, which added more than 4200 transmission circuit miles for below 189 kV and 300 miles for handling 189 kV and above. PacifiCorp added 6006 and 2327 circuit miles, respectively, for below and above 189 kV. But the company did not break out how many of these were attributable to its merger with Utah Power & Light.

In the distribution area, as might be expected, even less mileage was taken out of service.

The big distribution changes apparently were in converting overhead lines to underground ones.

Houston Industries went against this trend by apparently reducing its underground lines by 958 cable miles and adding 127 overhead pole miles of cable.

On the other hand, Southern Co. added 2257 cable miles of underground lines (but also added 1506 pole miles aboveground.)

Transmission lines loaded

Utilities will continue to sell electricity back-and-forth for economic and reliability reasons.

TABLE 5.
TOP SYSTEM HEAT RATES, CONVENTIONAL FOSSIL-FUELED BOILERS

Utility	Heat Rate (Btu/kWh)
1. Duke Power	9,387
2. Commonwealth Energy System	9,591
3. American Electric Power	9,707
4. CMS Energy (Consumers Pwr.)	9,737
5. Detroit Edison	9,836
6. New York State Elec. & Gas	9,873
7. Cincinnati Gas & Electric	9,887
8. United Illuminating	9,918
9. Florida Progress	9,924
10. DPL	9,934

However, notes NERC, parts of the bulk electric transmission systems in some regions may be loaded up to their limits of reliability much of the time by intersystem transfers added onto their normal loads. Controls for operating systems to coordinate the movements also may be taxed to their limits by all these transfers.

A coordination plan

For instance, portions of NERC's East Central (ECAR) region will be heavily loaded much of this summer. In fact, imports from the Mid-Atlantic region probably will be curtailed during peak demand periods because of transmission limitations.

A Reliability Coordination Plan was developed by utilities owning and operating the transmission systems in eastern ECAR, the Mid-Atlantic Area Council (MAAC) and a subregion of the Southeastern Electric Reliability Council (SERC). The plan is used to limit or curtail transfers to ensure system reliability is maintained in a specific part of the system.

Since transfer levels are predicted to be about the same as those of the summer of 1988, using the plan along with other operating procedures will probably be necessary to maintain reliability.

Region problems still exist

In the southern portion of the MAAC region, import needs will be heightened and critical transmission lines loaded because the Calvert Cliffs nuclear units will not be online. Emergency demand reductions may be necessary in the Baltimore-Washington area until Calvert Cliffs Unit No. 1 returns to service.

Some other regions

MAIN's (Mid-America Interconnected Network's) capability for importing from MAPP also is "marginally adequate," according to NERC.

And inside MAIN itself, Eastern Missouri's import capability from Kansas and Oklahoma are considered inadequate.

In addition, the South-Central Illinois transmission lines from Eastern Missouri and Eastern Missouri's from Minnesota are considered marginally adequate.

The rest of MAIN's transmission system interregional transfer capability is judged "adequate" for reliable operation for all transfers.

MAIN's export capabilities either increased or remained the same, except for those to the Southwest Power Pool (SPP), which went down slightly.

In the south

SERC (Southeastern Electric Reliability Council) transmission systems are becoming more heavily loaded due to the region's demand growth and increase in the number of transfers there.

In SERC, several interregional and intraregional transfer capabilities were reduced in the summer of '88 and remain reduced. Transfer limits also were lowered by wheeling and new patterns of generation dispatch.

However, NERC feels there is sufficient capacity in this region's transmission system to accommodate emergency transfers.

And the northeast

The NEPOOL portion of the Northeast Power Coordinating Council (NPCC) has a good transmission capacity outlook for the summer. Emergency measures should not be needed.

The New York Power Pool part of NPCC should get by all right by using contract interruptible demand and load management resources.

The situation also looks promising because of planned capacity increases of non-utility generators and Nine Mile Point Unit No. 1 returning to full capacity operation.

If all goes well...

Of course, all of the above predictions are based on several important assumptions:

- Weather will be "normal."
- Generation and transmission equipment will perform as reliably as expected.
- Large generating units undergoing their scheduled maintenance or refueling outages will be returned to service on time.
- Demand reductions expected from load management and interruptible demand will be as effective as planned.

Note these changes

The Top 100 Electric Utilities' Operating Performances Report has been modified continuously over the years, usually in minor ways. But this report has some major, if subtle, reworkings that are intended to reflect how the electric utility industry is changing.

These changes to the report involve the way combustion turbine and internal-combustion engine data are reported, new criteria for ranking individual unit heat rates and restrictions on steam boiler heat rate qualifications.

Combustion turbines, because of their growing importance to generating system upgrade and expansion plans, now are no longer lumped in with internal-combustion engines, but are reported on separately. This separate listing for combustion turbines can be seen in Tables 3 and 8.

Also in Table 8, diesel-generated power has been moved into the "Other" column because of its small contribution to the totals after combustion turbines are separated into a separate category.

Criteria for inclusion in Table 4 have been changed as a result of suggestions from readers. Fossil-fired generating units with the best heat rates now must have individual capacity factors of 50 percent or greater to be listed. Previously, selection was based on total system capacity factors. Readers pointed out that if individual units were to be singled out, then selection should be on the basis of these units' own specific capacity factors.

Lastly, Table 5 now lists the best heat rates for only conventional steam boilers, the major method of generating electricity in the country. In the past, the listing was not exclusively made up of this group.

If you have specific suggestions about how the Top 100 Electric Utilities Operations Report could be made even more useful, just put them on the postcard at the beginning of this article and mail it to *EL&P*. Every response will receive careful consideration when preparing future reports.

Midland partners complete sale/leaseback

DEARBORN, MI—Midland Cogeneration Venture—49 percent owned by CMS Energy Corp.—completed a $2.3-billion sale/leaseback transaction covering the Midland facility, the largest in U.S. history.

In addition, MCV partners announced creation of a second partnership to expand generating capacity at the 1370-MW combined-cycle natural-gas fired MCV.

A CMS Energy subsidiary also would be a 49-percent partner in that deal. No timeline was given for expansion, although it may be contingent on power sales to other Midwest utilities.

The 25-year sale/leaseback transaction was completed with a consortium of institutional investors.

Twelve-year permanent debt financing totaling $536 million was also arranged with 30 lenders.

CMS Energy subsidiaries' 49-percent MCV-partner interest has an investment value of $57 million, a 35-percent lessor interest with an investment value of $207 million, and four series of MCV notes totalling $1.2-billion. Also, CMS has rights to an additional $300 million in notes contingent upon successful appeals of certain regulatory decisions.

CMS said recent legal decisions support CMS's position, suggest that the Michigan Public Service Commission (MPSC) lacks jurisdiction over holding company control of assets and helped open the way for completing the MCV sale/leaseback deal. However, further litigation over the matter seems likely because state regulators contend the CMS share—$1.5 billion in assets—should remain with the utility subsidiary, Consumers Power Co.

On May 28, Ingham County Circuit Court Judge Thomas L. Brown refused to reinstate a preliminary injuction against CMS Energy Corp. and its subsidiaries (CMS). That preliminary injunction was vacated in a unanimous decision on May 23 by the Michigan Court of Appeals and remanded to the circuit court.

The Michigan attorney general and the MPSC sought the preliminary injunction to prohibit CMS from transferring or using the $1.5 billion in debt and equity interest received from MCV in exchange for assets from the abandoned Midland nuclear plant.

Equipment service group expands capabilities

MILWAUKEE—A-C Equipment Services Corp.—formerly part of Allis-Chalmers Corp.—has completed four acquisitions that become part of a newly formed Electrical Services Group.

Richard G. Carlson, president, A-C Equipment Services said, "Our services to electric utilities and large industrial customers include switchgear repair and testing, hydro generator services, replacement coil manufacture, and static excitation systems for turbo and hydro generators."

The hydro generator services and static excitation systems were acquired from Siemens Energy & Automation. Switchgear repair and testing business was acquired from Emmorton Electric Testing, Baltimore, MD, and a replacement coil business was acquired from Whittaker Electric, Grand Rapids, MI.

The group will headquarter in West Allis, WI, along with the switchgear repair and testing business, and the hydro generator services.

Replacement coil manufacturing will operate from Hammond, IN, in the facilities formerly owned by Southern Electric Coil Co. The static excitation systems will be based in Roswell, GA.

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LATE NEWS

KCP&L extended its tender offer until Sept. 14. By Aug. 20, it had 43% of KG&E shares. KG&E called the takeover attempt illegal.
Consumers Power Co. and PSI Energy Inc. plan a $105-million 345-kV link, due in Dec.'92.
The NRC is investigating its decision to license Seabrook (now at full power) based on charges that evacuation plans are inadequate.
Commonwealth Edison employees and their union made a fund for Chicago West Side customers who suffered losses from two fire-related outages (below). ComEd will match employee donations.
Long Island Lighting and Public Service Electric & Gas helped Con Ed restore service to 38-square blocks—1565 customers. Full restoration took a week. Seaport may take a year to rebuild (below).

Hostile takeover hits Kansas

Mergers turn tough in electric utility industry

Mark T. Hoske
News Editor

WICHITA, KS—Kansas Gas & Electric Co. urged stockholders not to accept the unsolicited $857-million cash tender hostile offer by Kansas City Power & Light Co.

KG&E said in a statement that the offer doesn't reflect values inherent in the company and that such an acquisition "could have significantly adverse effect on the company's employees, customers and the communities it serves."

KCP&L maintains the price is fair.

The July 23 offer had an expiration date of Aug. 20, although KCP&L said an extension was possible. The companies had talked of a merger over the past two years and previously discussed the possibility as early as 1983.

The offer represented a 37-percent premium over the market price of KG&E common stock on July 20, 1990, the last trading day prior to the commencement of the offer.

News analysis

KG&E directors evaluated the offer, then unanimously urged that shareholders reject it, saying $27 a share was inadequate. KG&E used investment bankers Morgan Stanley and Co. and the law firm of Reid & Priest to help with the evaluation.

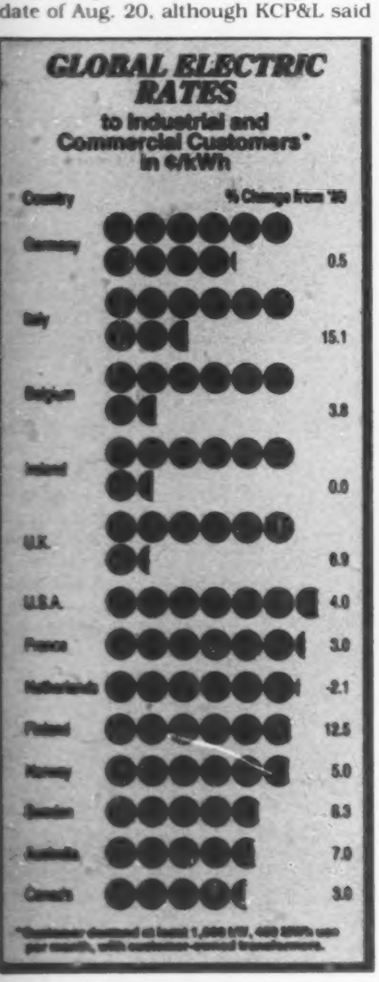
The utilities share service territory borders in Southeastern Kansas. They also jointly own 94 percent of the 1150-MW Wolf Creek nuclear plant, which produced more electricity than any other U.S. plant in 1989.

Hostile actions are new to industry

Although electric utility merger discussion activity has stepped up in the past few years, those activities previously have been held agreeably between utility top management. PacifiCorp's four unsolicited offers to Arizona Public Service management seemed a big step away from friendly negotiations. Now, KCP&L's hostile offer directly to shareholders is an unprecedented change in recent electric utility history. (See an outline of major merger activity below.)

Even if KCP&L's unsolicited offer doesn't succeed, the offer is another sign that the competitive edge is cut-

Continued on page 8



Rotating blackouts that hit Baltimore and DC are a 20-year first

WASHINGTON—High demand, low margins, extended nuclear unit outages, and sudden outages at other plants all contributed to mandated rotating blackouts for 280,000 customers of Baltimore Gas & Electric Co. and Potomac Electric Power Co. on July 5.

These controlled interruptions of service were the first at those utilities in about 20 years. But with slow supply growth, steady demand growth, dwindling capacity margins and constricted transmission capability, this could be a precursor of more to come for Northeastern utilities in the 1990s.

The high temperatures were 100° F in Washington and 104° in Baltimore.

Continued on page 15

ComEd substation fires, outages, lead to investigations

CHICAGO—Commonwealth Edison Co. incurred the wrath of customers, local officials and media, and provoked legislation and four investigations after two substation fires a week apart disrupted service to customers on the West side of Chicago.

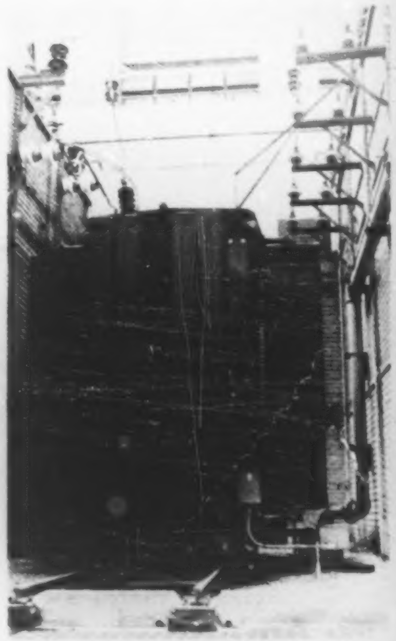
The July 28 blaze at a substation near the company's Crawford generating plant left 40,000 customers without power for as long as three days.

In an effort to restore service as soon as possible, ComEd delayed replacing electronic controls at Crawford that might have limited damage from a second transformer fire, Aug. 5, at the nearby Columbus Park substation, said Bill Downey, corporate operating manager.

The second fire destroyed a transformer and left 25,000 customers without power for 7.5 hours in the same area affected by the first fire. No cost estimates of damages were available.

Although some of the power that

Continued on page 12



Signs of fire show on the outside of a single-phase 20-MVA 69/12-kV transformer adjacent to Commonwealth Edison's Crawford Station Generating Plant. That July 28 fire caused outages for 40,000 customers on Chicago's West Side—some for more than three days. An Aug. 5 fire at nearby Columbus Park substation disrupted service to 25,000 in the same area.

Consolidated Edison substation blaze darkens NYC skyscrapers, halts trade

NEW YORK—A Consolidated Edison Co. Seaport substation fire on Aug. 13 blacked out about 50 square blocks of Lower Manhattan, including some financial trading centers. Fire damage was estimated at $25 million.

Customers started losing power at 12:35 p.m. As many as 4000 customers were affected (some skyscrapers are considered to be a single customer.) By 5 p.m., 1565 customers on the Seaport network were left without power (815 commercial and 750 residential—about 2500 residential units).

A Con Ed spokesperson expected some of the 1565 customers would have power by Aug. 16, and the rest by Aug. 19. ews planned to split network grid among acent ones. Con Ed ought in portable nerators for critical- e facilities, provided dry ice for customers and established a portable office near the site.

Despite some built-in fire extinguishing equipment, the unstaffed substation sustained "extensive damage." Second-story equipment, controls, buses and switchgear for 13 feeders on the network were "effectively destroyed," explained Con Ed's Dan Walden. Five 138/38-kV step-down transformers at the station were thought to be undamaged. The substation will be rebuilt.

Con Ed is investigating the fire's cause; circuit breakers were suspected. The four-alarm blaze took more than 100 firefighters four hours to put out; 28 needed medical care.

Because of the fire, buildings lost air conditioning, thousands of office workers walked down skyscraper stairs, some in elevators were trapped, hospitals used standby power, and several subway lines lost power for five hours. The trade centers reopened Aug. 14.

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NEWS BRIEFS

JILL MINNER, Special Projects Editor

FERC sets new ROR

The Federal Energy Regulatory recently set its quarterly benchmark rate of return on common equity for electric utilities at 12.06 percent. FERC said the rate applies to rate filings made by jurisdictional electric utilities between Aug. 1 and Oct. 31, 1990.

Filing requirements for IPPs proposed by SCC

The State Corporation Commission of Virginia said it is seeking comments on filing requirements it has proposed for independent power producers (IPPs). The proposal would require the IPP applicant to provide certain information, including: identification of the applicant and its organizational structure; information about the site and its acquisition; expected financing; and financial information about the applicant. The SCC would also require the utility purchasing the power to supply additional information about the need for the power and a cost/benefit analyses of supply alternatives. The utility would also need to demonstrate that with the IPP, its resource plans are reasonably calculated to promote the maximum effective use of energy and capital resources. "It is important to consider and formulate the standards and requirements which should be imposed on IPPs as new participants in the electric industry," the SCC stated. "Standards will not only assist the commission in our determination of whether to grant a certificate of public convenience and necessity and approve a proposed project, but will also provide IPPs and utilities an outline of the requisite information that must be included in an IPP certificate request." Comments on the requirements (case no. PUE 900044) are due by Sept. 28, 1990. Contact the Clerk of the Commission, c/o Document Control Center, P.O. Box 2118, Richmond, VA, 23216.

San Onofre-3 back up

Southern California Edison Co. reported that unit 3 of its San Onofre Nuclear Generating Station has been returned to service following completion of scheduled refueling. The 1100-MW unit was taken out of service April 14, SCE said.

NARUC issues survey; new directory available

A survey of what state commissions are doing to incorporate environmental externalities into the regulation of electric utilities, has been released by the National Association of Regulatory Utility Commissioners. The survey, conducted by Lawrence Berkeley Laboratory, found that 17 of the 50 commissions that responded have adopted explicit rules pertaining to environmental externalities. Also, most require electric utilities to consider environmental externalities in their resource planning and/or acquisition processes, NARUC said. Copies of *Environmental Externalities: A Survey of State Commission Actions* are available for $17 each from NARUC, P.O. Box 684, Washington, DC, 20044.

Also available from NARUC is its updated, pocket-sized directory of members, committees, officers and staff. The booklet contains a full list of names, addresses and telephone numbers of all officials serving on federal and state regulatory commissions within NARUC's membership, and lists the members of NARUC's executive committees and staff subcommittees. Copies of the directory may be obtained for $6.50 from NARUC.

PP&L to market energy conservation program

Pacific Power & Light Co. received approval from the Oregon Public Utility Commission to market a new energy conservation program to its commercial customers. The commission explained that while PP&L provides energy conservation services, the customer, over time, will pay an amount that fully compensates PP&L for its costs with respect to program expenses and lost revenues due to conservation, so that non-participating customers' rates will not be affected. PP&L hopes the program will increase market penetration of new energy efficiency technologies by giving the utility a profit incentive to promote conservation, according to the PUC. "PP&L's imaginative and resourceful approach is consistent with efforts of regulators throughout the United States to ensure that a utility's least-cost plan for consumers is also its most profitable course of conduct," said PUC Chairman Mike Katz.

CV proposes energy-efficiency programs

Central Vermont Public Service Corp. said it is seeking approval from the Vermont Public Service Board for a comprehensive package of energy-efficiency programs. According to the utility, the package, which includes financial incentives for customer participation and a comprehensive dairy farm program, is intended for existing residential, commercial and industrial customers, as well as new construction.

"We will offer our customers discounts and cash rebates through our new energy-efficiency programs. These programs also have the potential to save up to 40 MW of power," stated Patricia Wakefield, Central Vermont vice president of marketing/customer services. "CV's proposal will allow those benefiting from changing fuels to pay the cost of the conversion from the savings they will realize, rather than charging all our customers to pay for the programs through increased rates," she added.

In addition to the energy-efficiency programs, Central Vermont said it is planning to implement a solar water heating research program. The program is designed to evaluate both current technology and the use of solar water heating in conjunction with the company's existing off-peak electric water heating service.

NSP reorganizes

Northern States Power Co. recently announced a reorganization of its executive staff and the formation of a new unit. As part of the reorganization, Edwin Theisen, previously president and chief executive officer of NSP-Wisconsin, will now serve as president and chief operating officer responsible for NSP's three business units. Roland Jensen was appointed president of NSP Enterprises, a new unit that will expand upon the utility's existing subsidiaries, NRG Energy, Graystone, NORENCO and the refuse derived fuel processing business. "These changes ...ensure the continuance of our primary goal of providing low-cost, high-quality electric and gas service. It also allows us to focus on the growth and continuity of our company," said NSP Chairman and CEO James Howard.

Edwin Theisen

Roland Jensen

APPA names president

Timothy C. Morawski has been chosen to serve as president of the American Public Power Association for a one-year term. Morawski, general manager of the Holland (MI) Board of Public Works, has served on the APPA Board of Directors since 1983. Others named to one-year terms include: Randall Hardy, president-elect; Robert E. Nelson, vice president; C.M. Perkins, treasurer.

Ohanian to head ANS

The American Nuclear Society has announced the appointment of M.J. "Jack" Ohanian as president. Ohanian, Professor of Nuclear Engineering Sciences at the University of Florida, previously served as vice president/president-elect for ANS. He recently completed a two-year term on the U.S. Secretary of Energy's Advisory Committee on Nuclear Facility Safety, according to ANS.

SERI appoints director

Duane Sunderman, executive vice president and director of Kansas City Operations for Midwest Research Institute, was named director of the Solar Energy Research Institute. "This is an exciting time to be at SERI because of the renewed national attention to the dual problems of energy supply and environmental protection. It is a real honor for me to have the opportunity to work with a world class technical staff at a premier research laboratory at this particular time. I am looking forward to the challenge," Sunderman said.

Utilities fined by NRC

The U.S. Nuclear Regulatory Commission recently proposed the following fines:

Georgia Power Co.

A $50,000 civil penalty for an alleged violation of NRC security requirements at the Vogtle nuclear power plant. The NRC said a plant employee found a storage cabinet containing safeguards information material unsecured.

Northeast Nuclear Energy

A $25,000 fine for failure to promptly identify and correct adverse conditions at its Millstone Unit 1. As a result, the NRC said that the unit operated for extended periods of time while not complying with certain requirements specified in the technical specifications to its operating license.

Also, a $50,000 fine for not meeting the requirements for dewatering a cask containing contaminated solid waste sent from Millstone-1 for disposal.

Philadelphia Electric Co.

A $75,000 fine for allegedly operating Units 2 and 3 of its Peach Bottom atomic power station under adverse conditions. The violations involve the emergency service water system, according to the NRC.

IP to pay NRC fine

Illinois Power Co. said it will pay a $25,000 fine proposed by the Nuclear Regulatory Commission. The utility was fined for an operations error that occurred at its Clinton Power Station earlier this year, according to Illinois Power. NRC Regional Administrator A. Bert Davis said that the fine was reduced by 50 percent because, "once the violations for failure to carry out a proper control rod withdrawal procedure were brought to the attention of senior management, prompt and extensive corrective action was taken."

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COMMENTARY

Right or convenience: electricity viewed in new light

Recent substation fires, and subsequent blackouts suffered by Commonwealth Edison (p. 1), have elicited violent criticism of the utility by customers and consumer advocates from the area affected on Chicago's West Side. These were not gripes that followed natural-event outages from snowstorms, hurricanes or earthquakes. They weren't complaints of inconvenience.

No, these were the shouts and threats of angry people who felt they had been deprived of an essential part of their lives. With support from local politicians, welfare and consumer leaders, they charged the utility with mismanagement, faulty operations and poor maintenance practices. They demanded not just restoration of service, but compensation for contingent losses and for the service that Commonwealth Edison *did not* provide.

This, it seems to us, marks a very fundamental change in attitude...in fact a crucial change in the relationship of the utility and its customers. These angry Commonwealth Edison customers aren't looking at electric service as a convenience that they *may* purchase. Telephone and TV cable service are conveniences that may or may not be used, at the discretion of the customer. They aren't *necessary*.

But electricity is different. Electricity is vital, imperative, essential. In some areas hit by the resultant blackout, street safety is dependent on electricity. Foods can't be refrigerated or frozen without it. And in many of the neighborhoods of the blacked-out area, the only way residents can suffer through summer's overpowering heat is with electric fans and air conditioners.

Electricity has come to play such a key role that it has assumed an importance far above anything that can be left to the competitive process in the minds of many. As demonstrated in Chicago, it apparently now is considered to be a guaranteed right. To listen to critics of the utility, CECo is guilty of usurping that right and should be punished.

We aren't in a position to argue that CECo is above blame in the outages. Nor would we argue that CECo did all it could to alleviate the *inconveniences* of the blackouts or to provide as much information to customers, community leaders or the media as it might have. Assignment of fault is neither essential nor germain. In light of the spirit of the time and the mood of CECo's affected customers on the West Side, many Chicagoans simply believe they are entitled to electricity, like a God-granted *right*. Under these conditions virtually no outage would be tolerable.

Such an attitude, as we all know, isn't reasonable. It nevertheless exists. It is real. The years of stressing—in personal contacts, advertising and educational/informational programs—that electricity is vital and all-pervasive have paid off, but not quite as utilities had hoped. Spread of such attitudes could lead to real long-term problems for the industry.

Robert A. Lincicome, EL&P Editor-in-Chief

Independence at what cost?

Kansas Gas & Electric is fighting Kansas City Gas & Electric's unsolicited tender offer with both barrels. Pinnacle West Capital Corp. (Arizona Public Service Co.) has turned away four PacifiCorp offers.

Efficiency is an obvious reason cited for most utility combinations. We've heard the argument before in previous merger coverages (p. 1). During merger talks, utilities need to look out for their own interests. But executives should exercise caution that—consciously or unconsciously—job security, doesn't become too high a priority. We would hope that utility executives' decision-making is soundly grounded in what's best for customers, employees, communities and shareholders in these increasingly competitive times. The most difficult decision any manager makes is one that's personally risky, but professionally sound.

Mark T. Hoske, EL&P News Editor

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LETTERS

Clean air options

Your June issue contains a table on page 19, showing "Technologies to Meet Acid Rain Reduction Requirements," in which the Atmospheric Fluidized Bed Combustion (AFBC) technology listing is incorrect.

On the table, under the the Combustion-Stage Technology heading, the values for Atmospheric Fluidized-Bed Combustion (AFBC) should be: Removal Efficiency: SO_2—90-95%, NO_x—70+%; Status—Available.

The process would use ammonia $DeNO_x$ to get below 0.1 lb/mm Btu.

Christina Burtchaell
Communications Manager
PyroPower Corp.

More clean air options

I read your Industry News section on Clean Air options in the June *EL&P* issue. There are several clarifications that should be made to your readers for their evaluation of compliance technologies. These may become critical based on how the final bill addresses NO_x reduction. In order to accomplish this, Table I should have shown sorbent injection subcategorized into calcium-based and sodium-based technologies for the following reasons.

1. Sodium-based full-scale demonstrations now have shown SO_2 removals up to 90% with baghouses, and over 70% with electrostatic precipitators (ESPs). All demonstrations were completed at sorbent utilizations over 85% without humidification or ESP modifications.
2. All sodium demonstrations showed simultaneous NO_x reductions between 10% and 40%. Table I showed 0% (I assume for calcium-based technologies).
3. There have been five successful full-scale commercial demonstrations completed over the last three years. Public Service Company of Colorado stated at the recent EPRI/EPA SO_2 Control Symposium that it is commercially operating the first utility sodium-sorbent-injection system to meet agreed-upon SO_2 emission reductions. Another sodium sorbent system recently met performance warranties for 80% SO_2 removal on a baghouse at a coke calcining facility. Dry sorbent-injection systems using sodium bicarbonate now carry performance warranties. These facts qualify the technology as "Available" rather than "Commercial Demo" shown in Table I.

All three of these points become critical if utilities affected by Phase I have to meet SO_x and NO_x compliance within a short time-frame as written in the Senate bill. Low capital-cost technologies, such as dry sorbent-injection with sodium bicarbonate, are available, can be installed in under one year, can take advantage of two-for-one bonus allowances and earn simultaneous NO_x credits. Also, sodium sulfate, the primary by-product, sells for $60-$110/ton.

In Table III, NaTec should be NaTec Resources (as of October 1989) and should be listed under "Post Combustion Technology," rather than "Fuel/Boiler Additives."

Eric Darmstaedter
Natec Resources
Dallas, TX

Power conditioning

What do you do when the AC zaps your PC? The first thing, of course, is call a computer repairman—probably one at the store where you bought the machine—to find out what's wrong. Then you pray the problem is minor.

If you're lucky, the repairman can put your personal computer back in working order for only the cost of the service call; say two or three hundred dollars. But if you're unlucky, as I was, the tab can run to a thousand dollars or more.

In my case, the damage was close to two thousand dollars, about half the original cost of the machine. The circuit boards in my PC were fried when lightning struck a power line near my home during a thunderstorm. To make matters worse, the repair cost was not covered by insurance.

But wait. That's only half the problem. Your woes are just beginning. You now have to protect your PC so the same thing won't happen again.

This is where the frustration really begins: Try to find a retail clerk who can explain the ins and outs of how to protect a PC against lightning-induced voltage surges, power transients, spikes (overvoltage) and other things most people never heard of.

The computer repairman who made my machine work again told me that I should cover my investment with surge protection.

"What kind of protection?" I asked.

"Surge protection," he said. "It's also called power conditioning. You can buy surge suppressors at most department stores, home stores and electronics shops, but you'll probably have to pay an electrician to install a lightning arrestor."

Buying surge suppressors seemed simple enough, so I headed off to the nearest home supply discount house.

"Surge suppressors? Sure," said the tall, enthusiastic young saleswoman. "Follow me. If you had asked me a week ago, I wouldn't have known what you were talking about. Now, I know all about 'em." She led me to an aisle where an array of products, in brightly colored packaging, dangled from metal display rods.

There were varied sizes, shapes and number of outlets. Some of the printed information on the packaging said the device inside would suppress "voltage surges" in five nanoseconds. Other packages proclaimed their devices not only would suppress surges, they also would "filter noise and radio interference." And they would do it in less than one nanosecond. Others mentioned time in milliseconds; still others, microseconds.

"This is very confusing," I said to the salesperson.

"What are you looking for?" she asked.

I explained.

"How many computers do you have?" she asked.

"Just one."

"Well, then, this is all you need," she said, handing me a small (2x2x1.5 inch) single-outlet, plug-in surge suppressor with a price tag of $3.95.

"Are you sure I don't need one of these bigger suppressors?" I asked, pointing to some of the more expensive, multiple-outlet devices.

"Why?" she asked. "You only got one computer, right?" This is all you need, one protector."

Somehow, I did not feel comfortable that this person was a surge-suppression expert.

I hedged, stating, "I have to talk with my wife before making a decision. We may want to protect our microwave and television set, too. I'll have to come back. Thank you for your time."

I left, even more confused than when I went in.

Visits to five more stores—another home supply outlet, two electronics

Continued on page 25

Arizona PS returns all 3 Palo Verde reactors to service; Unit 3 trips

PHOENIX—All three Palo Verde units operated simultaneously on July 19 for the first time since March 1989.

Palo Verde Unit 2 returned to service following a five-month refueling outage. Unit 3 was down briefly in August.

The units are rated 1270 MW each.

Arizona Public Service Co. operates the units and owns them with Salt River Project, Southern California Edison, El Paso Electric, Public Service of New Mexico, the Southern California Public Power Authority and the Los Angeles Dept. of Water and Power.

Extra maintenance performed

While Unit 2 was down for refueling, plant operators took the opportunity to perform maintenance work on reactor coolant pumps, valves, control-element drive mechanisms, and electrical systems. Steam generators were inspected and repaired and the overall maintenance backlog was reduced.

Don Andrews, of Palo Verde Communications, reported that Unit 3 was shut down Aug. 5-7. A failure in the electronic control-rod circuitry caused one rod to fall into the reactor 4.5 inches (out of 12 ft), he explained.

All three units are scheduled to operate without interruption for the rest of the year.

Correction notice

BARRINGTON, IL—United Illuminating Co. notified *EL&P* that an error was made when UI reported its system heat rate for the Top 100 Operating Performance (*EL&P*, Aug., p.28). The correct heat rate for the utility in 1989 was 9940 Btu/kWh, which moves UI to No. 8 in Table 6—a spot it then shares with Detroit Edison Co. Commonwealth Energy System, with the best heat rate, therefore becomes No. 1 in the listing.

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from page 1

Hostile takeover...

ting into the electric utility industry ever deeper.

In the statement issued recommending rejection of the offer, KG&E directors said the many conditions that went with the offer were also a concern.

KCP&L conditioned the offer on a number of factors including:

- Receiving at least 90 percent of common and preferred shares.
- Being able to follow the "short-form" of merger provisions according to Kansas and Missouri law, and comply with other state laws.
- Receiving regulatory approvals.
- Obtaining sufficient financing to purchase tendered shares and pay for related merger expenses.

A July 23 letter from A. Drue Jennings, president and CEO of KCP&L, told Wilson K. Cadman, chairman and president of KG&E that "The logic behind the offer is quite simple: We believe it offers substantial advantages to all constituencies served by both utilities.

"Due to anticipated cost savings and reduced capital expenditures [that] will result from the combination, KCP&L is committed to freezing rates for all of the KG&E and KCP&L retail and wholesale sales for resale customers through Jan. 1, 1993." Jennings said the savings will come, in large part, from a delay in building new generating capacity for KCP&L and using KG&E capacity more efficiently. KCP&L's capacity reserve is about 15 percent, compared to KG&E's 34 percent.

"We estimate the combined company's cumulative revenue requirements during the first five years after the merger would be at least $85 million less" than they would be without the merger, Jennings explained.

KCP&L said it does not anticipate any layoffs, or reductions in salary or benefits as a result of the merger, Jennings added.

Company statistical comparison

KCP&L, with 2,800 employees, serves 409,000 electric customers located in more than 4700 square miles in Kansas and Missouri. Based in Kansas City, MO, that metro area accounts for 95 percent of KCP&L business. Net income in 1989 was $108.6 million, with sales in excess of 10.2-billion kWh. Generating facilities total 3048 MW.

KG&E, with 1,330 employees, serves 254,771 electric customers over 8100 square miles of Kansas. Based in Wichita, that city accounts for 60 percent of its revenues. Net income in 1989 was $47.5 million on sales of 8.9-billion kWh. Active generating facilities total 2434 MW.

Recent merger activities

Other major merger activities include the following.

- Northeast Utilities Co. awaits FERC approval for acquiring Public Service Co. of New Hampshire for $2.3 billion as part the PSNH bankruptcy reorganization. PSNH filed for Chapter 11 bankruptcy protection in January 1988.
- San Diego Gas & Electric Co. dropped merger plans with Tucson Electric Power Co. in November 1988, then agreed to merge with SCEcorp. That merger is underway.
- Holding companies Iowa Resources Inc. (Iowa Power & Light Co.) and Midwest Energy Co. (Iowa Public Service Co.) revealed merger plans on March 16 and hope to receive approvals to complete their merger by the end of the year.
- Pinnacle West Capital Corp.—owner of Arizona Public Service Co.—turned down four merger offers from PacifiCorp, a company that completed a merger with Utah Power & Light Co. on Jan. 9, 1989.

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OCTOBER 1990

ELECTRIC LIGHT & POWER

EL&P

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VOICE OF THE ELECTRIC UTILITY INDUSTRY

LATE NEWS

NAPAP: Acid rain is no crisis. Clean Air could cost billions less, p.12, but would save 32% more oil than Iraq/Kuwaiti imports.

Congress may settle Clean Air in October. A bill could hike strategic oil reserves 33% to 1 billion bbl. Oil hit $40/bbl, a 10-yr high.

EMF doesn't cause cancer, p.13.

A federal court said Nevada must allow DOE Yucca site tests.

Arizona Public Service cuts 675, 13%, of 4908 employees. APS has cut 400 since Jan.1.

Gulf States Utilities won't get to tell state regulators again why it should recover $1.4 billion in disallowed nuclear plant costs: Texas Supreme Court. GSU appealled.

Swiss voters keep nuclear plants open—40% of generation—but halt construction for 10 years.

Oil price hikes extract advice

Mark T. Hoske
News Editor

WASHINGTON—The Iraq-Kuwaiti crisis has given the electric utility industry the opportunity to promote energy conservation and other energy policies to customers, legislators, and to the Department of Energy for the emerging National Energy Strategy.

Views touted by various industry leaders include the need to renew the nuclear option, augment coal technologies and renewables, increase domestic oil and natural gas production, cut dependency on imported oil, and, perhaps most uniformly, increase energy efficiency.

Iraqi and Kuwaiti oil lost through the blockade amounts to an estimated 9 percent of world production, 4.45-million bbl/day, according to the Department of Energy. With other countries' increases in production, that shortfall had fallen to 3.5 million bbl/day in mid-September and was expected to fall to a million barrel per day as early as November, DOE said.

The U.S. imports more than half of its oil and half of that comes from the Middle East. However, less than 4 percent of U.S. oil consumption goes to utilities; transportation consumes nearly two-thirds.

Impact on utilities

Nationwide, 5.7-percent of utility capacity was oil-fired in 1989; some regions vary widely from this figure. Despite that, oil price hikes can have a severe impact on utilities heavily reliant on oil (see related story, right).

The Mideast oil embargo of 1973 caused the market price of oil to increase fivefold. In the 1979 crisis prices

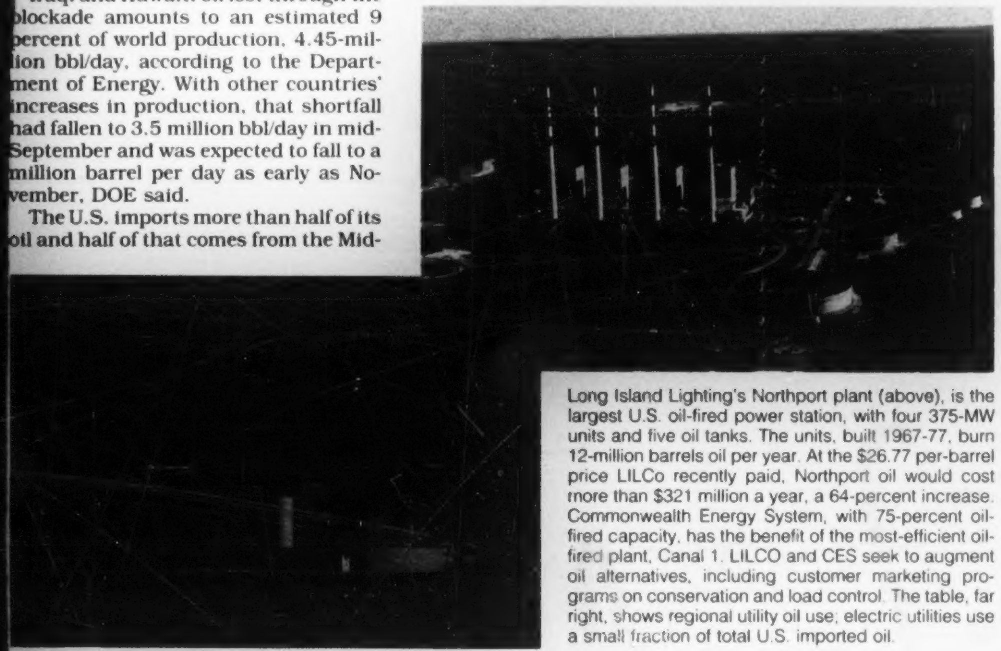
Continued on page 48

2 oil-fired utilities explain

BARRINGTON, IL—Two utilities among the most dependent on oil are Commonwealth Energy System, Cambridge, MA, and Long Island Lighting Co., Hicksville, NY.

CES has about 75-percent oil-fired generation, 619 MW; LILCo, because of a winter shortfall of natural gas pipeline capacity, has 72-96 percent oil-fired generation, 4271-4660 MW, depending on the season. LILCo has the largest oil-fired plant; CES, the most efficient.

Both continue to invest heavily in energy efficiency programs to ease their dependence on oil.



Long Island Lighting's Northport plant (above), is the largest U.S. oil-fired power station, with four 375-MW units and five oil tanks. The units, built 1967-77, burn 12-million barrels oil per year. At the $26.77 per-barrel price LILCo recently paid, Northport oil would cost more than $321 million a year, a 64-percent increase. Commonwealth Energy System, with 75-percent oil-fired capacity, has the benefit of the most-efficient oil-fired plant, Canal 1. LILCO and CES seek to augment oil alternatives, including customer marketing programs on conservation and load control. The table, far right, shows regional utility oil use; electric utilities use a small fraction of total U.S. imported oil.

CES expects its average electricity price to increase from 6.07¢/kWh to near 9¢/kWh in the last quarter, as a result of higher oil prices, increased conservation efforts and the cost of the now-operating Seabrook nuclear plant.

Before the crisis, CES had purchased the required No.6, 2.2-percent sulfur fuel oil at $13 per barrel; prices rose to $22.40 per barrel. As a result of a September filing to recoup the higher fuel costs, the utility expects a "rather dramatic increase" in the customers' power supply charges. Massachusetts charges customers directly for fuel, purchased power and wheeling costs.

Higher charges will hit CES customers four ways due to: higher fuel costs, under collection in the third quarter, a new energy conservation program that began

More efficiency, p.3

Aug. 1, and commercial operation of the Seabrook nuclear plant.

These factors, result in an "estimate at this point of a three-cent increase, depending on price of oil," said CES's John Farnham, in the last week in August. "Perhaps it could go up a little more; but probably not much less."

CES, while highly reliant on oil-fired generation, has the benefit of Canal 1, the most efficient oil-fired plant, and the third overall, in EL&P's "Top 100 Operating Report" (Aug.'90, p.31).

In addition, the utility and state regulators have worked together with groups that have been ardent critics of CES to set up a new energy efficiency program. The five-year plan will invest $69 million, save an estimated $81 million in electricity and return the net $14 million savings to customers.

CES will "buy back kilowatts from customers," Farnham explained. All customers pay for the program's cost through the fuel charge so improvements appear free when the work is done. Residential contractors survey homes, wrap electric water heaters, insulate to reduce heat loss, and provide up to four efficient light bulbs, and a low-flow shower head. In commercial facilities fluorescent or other lighting is installed or upgraded, with high-efficiency ballasts and reflectors; larger commercial and industrial customers get upgrades in high-voltage air conditioning.

LILCo's annual fuel mix for the year-to-date second quarter was 60-percent oil, 14-percent natural gas, 13-percent net purchases, 7-percent nuclear and 6-percent independent power production. LILCo's oil requirements increase in the winter when it can't burn natural gas; gas is needed for heating—New England pipeline capacity is low.

LILCo's Northport Plant is the largest U.S. oil-fired plant, with four 375-MW units and five oil tanks. Fuel used there

Continued on page 49

Energy tax? Budget cuts?

WASHINGTON—As of mid-September, some form of the energy tax proposed by the Bush administration remained as part of the federal budget package under negotiation. The tax has been assailed as a bad idea by numerous industry groups and utilities.

If negotiators fail to strike a compromise package for the president to sign by October, automatic, across-the-board cuts of more than $100 billion will take place, according to the Gramm-Rudman deficit-reduction law.

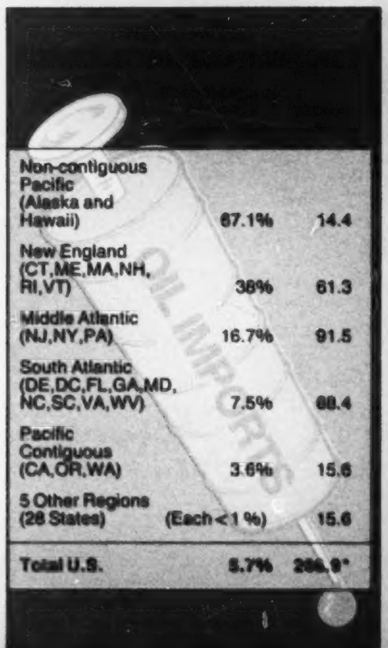
Those federal budget cuts would involve the Department of Energy and other energy departments/agencies.

Energy tax to cut deficit

The "Btu" or "carbon-content" tax, proposed as part of a deficit-reduction package, could raise more than $14 billion of the $25 billion sought in new taxes annually.

"Such taxes are regressive, inequitable and anti-competitive," according to a joint statement by the Edison Electric Institute, American Public Power Association, the National Rural Electric Cooperative Association and the American Gas Association.

Consumers, income classes, industries and regions would bear uneven burdens on essential services, and harm the economy and U.S. global competitiveness, the statement said.



OIL IMPORTS

Non-contiguous Pacific (Alaska and Hawaii)	67.1%	14.4
New England (CT,ME,MA,NH,RI,VT)	38%	61.3
Middle Atlantic (NJ,NY,PA)	16.7%	91.5
South Atlantic (DE,DC,FL,GA,MD,NC,SC,VA,WV)	7.5%	68.4
Pacific Contiguous (CA,OR,WA)	3.6%	15.6
5 Other Regions (28 States)	(Each<1%)	15.6
Total U.S.	5.7%	266.9*

NEWS BRIEFS

MARK T. HOSKE, News Editor

Substation safety rules: no umbrellas or leaning

Use your head, as well as protective headgear at substations, Puget Sound Power & Light Co. told employees recently in a safety booklet and in the weekly employee newsletter, "The Outlet."

Employees unfamiliar with substations are especially at risk from carrying umbrellas, bumping into things, or just leaning against wires, terminal strips, fuses, or other exposed items. "Things [in substations] are not insulated like they are in our homes, so it's easy to accidentally bump into something ...and ruin your day," said Puget Power's Jim Boyd, safety coordinator, and co-author of the booklet. The booklet, with input from across the company, covers safety tips prior to arrival at a substation, the buddy system, operation of vehicles in substations, observation rules for employees without substation responsibilities, and the hazards of climbing fences, equipment or ladders. "Keep your hands in your pockets," added Boyd.

Industry transitions

William D. Barnard was appointed executive director of the Nuclear Waste Technical Review Board. National Hydropower Association named **Sen. Dale Bumpers** (D-AR) Hydropower Person of the Year. **Robert K. Harbour** was named president and COO of Iowa Southern Utilities Co. as well as vice president of the parent company, Iowa Southern Inc. Harbour was also elected to the holding company's board. **Calvin Kent** was sworn in as DOE's administrator of the Energy Information Administration. **Frank E. Lammers,** president of Peabody Engineering Corp. has been re-elected president of the American Boiler Manufacturers Association. **Neil A. Norman,** Bechtel National Inc., was installed as president of the National Society of Professional Engineers. **Paul L. Ziemer** was sworn in as assistant secretary of energy for Environment, Safety and Health.

Consumers Power wins in safety

Consumers Power employees have won the National Safety Council's (NSC) First Place Award each of the last three years. "Maintaining such a high level of safety performance as Consumers Power's employees have, over such a long period of time, is indeed a demonstration of national leadership in industrial safety," said NSC Vice President Thomas J. Decker. Consumers Power, based in Jackson, MI, has received the award six times in the past nine years. In 1989, the company recorded a lost workday incident rate of 0.09. By way of comparison, the average lost workday incident rate in the utility industry last year was 0.89. (NSC's rate = no. of lost workday cases × 200,000 ÷ total hrs worked.) Company employees worked 7.8-million hours safely from Dec. 5, 1988, to May 2, 1989.

NRC proposes fine

The Nuclear Regulatory Commission staff proposed a $25,000 fine against Illinois Power Co. for two violations of NRC safety procedures during the withdrawal of reactor control rods at the Clinton Nuclear Power Plant in Clinton, IL. Operators allegedly failed to note that turbine-generator bypass valves had partially opened, allowing some steam to bypass the turbine and enter the main condenser.

DOE radwaste director sets management plan

John W. Bartlett, director of the Energy Department's office of Civilian Radioactive Waste Management (OCRWM), issued the Management Systems Improvement Strategy in August. The 20-page management approach shows how the OCRWM will achieve the Congressional mandate for developing a disposal system for spent nuclear fuel and high-level nuclear waste. "The disposal of this waste in a safe and environmentally acceptable manner," Bartlett said, "is a key factor in the maintenance and restoration of the nuclear power industry." DOE plans to establish a capability to begin accepting, transporting, and storing waste in a Monitored Retrievable Storage facility by 1998 and the emplacement of the waste in a permanent geologic repository by 2010.

Coal, employees arrive at Zimmer plant

First coal was unloaded at Zimmer Station in July, and staffing needs are nearly met. Consolidated Coal Co. supplied 6000 tons of Ohio coal, unloaded from barges. Zimmer will burn 3.5-million tons of high-sulfur coal per year. The 1300-MW station will need 275 employees. About 100 will come from within Cincinnati Gas & Electric Co. CG&E Electric Production is assisting the Employment Division with hiring. CG&E, Dayton Power & Light Co., and Columbus Southern Power Co. (AEP) own the plant, due to operate in April 1991.

Industry recognizes leading achievements

Recent awards include:

- **Texas Utilities** Co., which received "Special Distinction" recognition in the Edison Electric Institute's fourth annual Common Goals award. TU's "Paint the Town" program has improved homes and community service facilities, increased public awareness, served its communities and increased employee pride. The program has grown to 7500 active and retired employees.
- **Pacific Gas & Electric Co.** received the state of California's first Air Pollution Reduction Award for pioneering work to remove hydrogen-sulfide gas from geothermal steam and reducing hazardous wastes by as much as 90 percent at The Geysers Power Plant.
- **Richard Balzhiser,** president of the Electric Power Research Institute, received one of five awards for worldwide environmental and energy related achievements at the annual Responsive Energy Technologies Symposium and International Exhibition (RETSIE). "He was selected because of the work EPRI has been doing in anticipating and improving the energy choices available for the future," said Richard Green, RETSIE's executive director.
- **Bertrum Wolfe,** vice president and general manager of GE Nuclear Energy, received the Walter H. Zinn Award for outstanding contributions to the 'advancement of nuclear power. Wolfe was commended for work in almost all phases of nuclear energy: reactor design, fuel supply, waste management, and development of new reactor concepts, according to the American Nuclear Society.

SoCalEd-plant experts assist space shuttle

San Onofre's Chiu, Phoenix, Heise helped find a Shuttle hydrogen leak.

Southern California Edison Co. experts used thermography and trouble shooting technology to help locate evasive hydrogen leaks that have grounded the U.S. Space Shuttle fleet. SCE lent Chong Chiu, William C. Phoenix, and Brian Heise from the San Onofre nuclear plant to Shuttle contractor Rockwell International, Space Systems Division, in July. The team demonstrated thermography—infrared-video and still cameras used to analyze thermal patterns. That technology is used at San Onofre to inspect electrical and mechanical components. Chiu leads the plant's "Root Cause" investigation team.

M.C. Cioffoletti, vice president of Rockwell Space Shuttle Integration and Cargo Systems, stated in a letter to the SCE team, "The use of your equipment and support personnel assisted us in returning the Shuttle fleet to flight status in the shortest possible time."

Another state leans toward competitive bids

The staff of the Ohio Public Utilities Commission has recommended guidelines for competitive bidding for energy resources within the commission's least-cost planning process. Under the plan, utilities could still acquire resources through other means. The plan needs commission approval. Staff suggested that the commission not be directly involved in bid evaluation and selection, but that the process should follow commission guidelines. Generation and conservation bids should be conducted separately; utilities or their affiliates should not be allowed to participate in the utility's own bid requests.

Cablec finishes sell-off

Cablec Corp.'s Brand-Rex Co. completed the last of a series of divestitures of businesses unrelated to its core cable business. Brand-Rex sold North Carolina Modular Products Group to Hubbell Inc. Since Cablec bought Brand-Rex in June 1989, divestitures have brought more than $125 million, the company said. "We intend to strengthen our position in the electronic cable business through new product development, increased production capacity and strategic acquisitions," said Charles Killeen, Brand-Rex Electronic and Industrial Group.

PS Co. of New Mexico looks at buyout idea

Public Service Co. of New Mexico is looking with a "preliminary expression of interest" at a buyout offer of $12 per share from Wheeler Peak Capital Corp. WPCC is led by a former senior vice president and chief financial officer, Albert Robison. Robison was involved in PSNM's restructuring proposal in 1987. That failed proposal involved splitting the company into two companies, generation and distribution (GENCo and DISCo).

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COMMENTARY

The unlearned lesson learned?

If only Mary Poppins were real! You'll recall that she's the one who sang "A spoonful of sugar makes the medicine go down...in a most delightful way." Looking at prices on the gas pump recently, I couldn't help thinking that we could use a dose of sweetening, in a real sense, to swallow the necessary medicine to alleviate our energy maladies...practically and permanently.

I couldn't help but wonder what might have happened if we had followed through on our initial resolve following the oil embargo in the mid '70s. With Jimmy Carter's declaration of the Oil Crisis (he insisted on calling it THE Energy Crisis, as did most media) being the moral equivilent of war ringing in our collective ears, the whole nation embarked on a strategy to get off our petroleum binge and slash our dependency on foreign energy sources. Synthetic fuels, oil shale and oil sands, coal gasification, stringent auto mileage requirements all were aimed to achieving that goal. But as soon as the price of petroleum and its byproducts began to fall again, one-by-one anti-dependency measures fell by the wayside. Cheaper oil prices meant synthetic fuels wouldn't be cost competitive right away, so dump the development programs. Oil sand and oil shale developments were too costly and inefficient. Coal gasification lost its luster. Car makers that were quick to cut vehicle weights to reduce fuel burn initially objected to continuing to meet tougher fleet mileage requirements because they were increasingly expensive. Big cars came back. Plastics are more pervasive in our lives. Our thirst for oil surged again.

So today—a decade and a half later—we're right back where we were...in fact even worse off than in the '70s. We're more dependent on Mideast oil than ever...more scared of what loss of Mideast oil would do to the economy.

There's no question about it, we're suffering an *Oil* Crisis again. Not an *Energy* Crisis. We have a more than adequate natural gas supply. Electricity based on domestic coal, uranium, hydro and gas—and little oil—remains abundant and still relatively cheap. But we're again strung out by our insatiable craving for petroleum, primarily for transportation. Paranoia about life with reduced petroleum has triggered a precipitous decline on Wall Street and in world financial markets. We're even ready to go to war for oil.

The lesson has been taught again. Will we learn? Do we have the purpose to pay the premium now to eliminate a repeat of this painful process again? Sure we will...at least until prices at the pump fall again.

No how do you spell that magic word again? SUPERCALI.....what?

CECo's problems continue

The trials and tribulations of Commonwealth Edison Co. continued in late September, raising new questions about service reliability, rates and its own maintenance management programs. The recent problems that have hit the Chicago-based utility mark a new low point in the turnaround from the 1970s and early 1980s, when its nuclear plants contributed to rates that were among the nation's lowest, reliability was high and [illegible] reputation was impeccable.

Today CECo's rates are among the nation's highest. Its completion of nuclear plants under construction raised the ire of customers and the Illinois Commerce Commission. Recent outages—two major ones a week apart in late summer and four additional less-severe blackouts in mid-September—heap additional fuel on the fires of discontent confronting the company. CECo's franchise with Chicago ends Dec. 31 and is in question.

All of this goes to show what happens when the utility, customers and regulators don't march to the same drummer. CECo management believed it economically responsible to complete the nuclear plants it had started. The commission and various consumer advocacy groups disagreed. Attempts to develop fair and responsible rate adjustments have failed.

Was maintenance of power delivery equipment postponed in the face of surging nuclear plant construction costs in the mid- to late-'80s? Has it slipped further in light of the company's sagging financial status? The state commission is launching an investigation. The mood of customers and politicians being that they are, it seeks unlikely that CECo will get what it needs most—responsible long-term rate relief.

Robert A. Lincicome, EL&P Editor-in-Chief

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LETTERS

O_2 problems, too?

Global warming is currently a "hot" subject and everyone is pointing to the increase in carbon dioxide (CO_2) in the atmosphere as the main cause for this warming trend. If there is an increase in CO_2 then there should be a corresponding decrease in the oxygen (O_2) content of the atmosphere. How come no one talks about it? My calculations show that a 4% increase in CO_2 results in a 3.2% decrease in O_2 by weight.

Since O_2 is so vital to the proper functioning of the human body, especially the brain, shouldn't this be of concern to the scientists? What would be the safe limit below which life on this planet could be threatened because of lack of sufficient oxygen in the air? I am groping for some answers. I hope some of your readers who are knowledgeable in this area will enlighten me. Thank you.

N. D. Sadanandan
Tennessee Valley Authority
Hixson, TN

Sweet heresy!

I cheered wildly within as I read Mark Hoske's totally irreverent, but oh so enlightening "Strategies for the '90s." (*EL&P*, Aug. 1990, p.3.)

"Ignore heat rate?" I got my utility start in plant results engineering when Phil Sporn *et al* were pushing heat rates in the same directions as their golf scores, that is if they could pull themselves away from their plants long enough to play a round or two. Anathema, I shrieked to myself. Then proponent Dave Jones' logic sank in, making complete business sense.

"Forget pricing?" And push customer service instead? In his advice that utilities rethink customer relations, Joel Gilbert's mimicking a utility manager's care-less-ness turned my thoughts inward. I was reminded of when the gut-wrenching bumpersticker "You've obviously mistaken me for someone who cares" zoomed past me for the first time on my commute to work. As a utility middle manager I couldn't internalize it then, and I still abhor its message. The only way I can rationalize Gilbert's thought-provocation within utility industry management is this:

There is a steadily growing perception among utility rank-and-file that they have been forgotten by *uncaring* management. The tragedy of the matter is that utility executives *give the impression* of being unconcerned, bringing employee morale to an all-time low. Utility employees perceive their managements as totally preoccupied and distracted by external imperatives while neglecting important internal aspects of company and industry cultures. There is always something more pressing to their managements than themselves, employees reason, and, in a *de facto* sense, they are right. Executives are perceived as busily and exclusively engaged in fighting external fires, while ignoring employee-smoldering within until some crisis erupts. Today, when perception is reality, enlightened utility managements will not allow important employee issues to languish due to benign neglect, not if we hope to provide the kind of services our customers expect of us—services, such as Joel Gilbert reminded, that "utility customers will choose...primarily on human relations."

"Keep staff to cut costs?" Richard A. Mazzini's powerful third point presupposes a talented pool of employees (as motivated by caring management!) to make the difference between business success and failure in these tough times.

I cheered the loudest when I came to where PP&L "trimmed layers." Then I realized that I had read it with a Shakespearean fervor. I mistakenly though it said "trimmed lawyers!"

Name withheld by request

Editor's note: Always glad to see readers enjoy our reports of novel and unusual solutions to industry problems. There's more due in coming issues.

Energy taxes

The proposed Btu and carbon energy taxes, together or separately, would be economically self-defeating. They would in fact help to widen the trade deficit, because the energy taxes will be passed on to consumers through higher prices for domestically produced goods. One result would be to lower the comparative price of imported goods, making them more attractive for Americans to buy. At the same time, the higher price of U.S. exports would reduce U.S. global economic competitiveness and depress overseas sales.

The two energy taxes will cause federal outlays to increase as the Nation's social welfare system expands to help pay for such necessities as heat, cooking fuel and electricity for the sick, the poor, the fixed-income elderely and other needy groups.

Although some have been reported as arguing that energy excise taxes would fall in roughly equal proportion to income for most taxpayers except the very poor and very wealthy, as a utility executive I can tell you that there are many other people who already are confronting "heat or eat" decisions. Further burdening them with such regressive taxes is unconscionable.

The proposed energy taxes also are grossly inequitable because they discriminate against states with energy-intensive manufacturing economies, some of which, like Michigan, are major exporters of U.S. goods. Such inequity would perpetuate the "regional warfare" that has characterized much of the Clean Air Act debate. The top 10 energy-intensive states will pay more than 50 percent of the total tax raised, at a time when the Clean Air Act Amendments expected to pass the Congress this year will impose onerous new economic burdens on energy and other manufacturing operations through tighter emission controls. The additional cost for Michigan alone of either the proposed Btu or carbon energy tax could be more than $1 billion, much of which would fall on energy-intensive manufactured products facing intense foreign competition.

Behind the move to unfairly focus on energy as a source of new tax revenue lies a misconception that our national energy use has been excessive and that energy prices have ballooned. Some have suggested that a tax on the consumption of energy would discourage its "excessive use." Energy, though, is largely a necessity and a great deal of conservation and energy efficiency already have occurred. Imposing an indiscriminate tax on all energy use to cut the deficit is neither wise economics nor energy policy.

But let the final words be those of President Bush, who recently told a press conference called after his decision to take a new look at taxes, "I think taxes wrongly applied can kill economic growth."

William T. McCormick, Jr.
Chairman and CEO
Consumers Power Co.
Jackson, MI

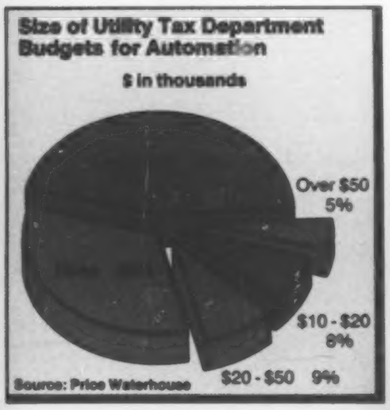
Automated taxes would benefit utilities, says survey

NEW YORK—Utilities haven't spent as much effort automating their tax departments as other areas, and could save money by doing so, suggests a recent study by Price Waterhouse.

"In the utility industry last year, income, property, and other tax expenses consumed 11.5 percent of operating revenues nationwide, based on data we have collected," said William H. Walker, managing partner for tax service in Price Waterhouse's Public Utility Industry Services Group.

The report was released in August and was based on a fall 1989 survey that included 90 utilities. More than 60 provided electric or combined electric and gas services.

"Despite the importance of taxes, in many cases the tax function in public utilities has remained essentially unchanged while the technology capable of revolutionizing operation has developed," Walker explained.



Source: Price Waterhouse

Automation benefits

The Price Waterhouse study shows how public utilities' tax departments may benefit from automation. Computer tax-return processing and electronic tax research automation could:

- Streamline workload.
- Improve making deadlines.
- Eliminate duplicate record keeping by data sharing.
- Improve analyzing transactions or IRS positions during negotiations.
- Allow managers additional time for tax research and planning.
- Compute tax depreciation with utility specific software.

> "78 percent had annual automation budgets of less than $10,000"

The survey seemed to show piecemeal automation implementation among utilities' tax departments.

Formal automation plans

Only 42 percent of respondents had formal automation plans for their tax departments, while 78 percent had annual automation budgets of less than $10,000. About 33 percent had no automation budgets, even though 61 percent of the respondents had annual revenues of more than $500 million. Of the ones that did have automation, two-thirds were PC-based.

Free copies of a 28-page "The Public Utility Industry—Tax Department Automation" may be obtained from William H. Walker, Price Waterhouse, P.O. Box 1097, St. Louis, MO 63188.

10-yr air study: get cleaner air for billions less

WASHINGTON—While Congress hammers out differences in Senate and House Clean Air bills, a $500-million 10-year final report mandated by Congress suggests less stringent measures would provide as much environmental benefit for billions of dollars less a year.

The National Acid Precipitation Assessment Program (NAPAP)—history's most comprehensive acid-rain study—says that the timing of emissions reductions is not critical to the environment, especially in the short term (1-10 years).

Based on the findings, the Edison Electric Institute said, "before Congress and the administration reach a final decision on the most expensive, encompassing clean-air regulations, we strongly encourage them to closely examine NAPAP's report."

The National Coal Association pointed out that NAPAP's "evidence indicates that an 8-million-ton reduction of sulfur dioxide emissions will cost about half that of the currently proposed 10-million-ton reduction, with little or no impact on environmental benefits."

Proposed legislation's acid-rain provisions are likely to cost $5-7 billion per year.

Advice: let Treasury Dept. help EPA

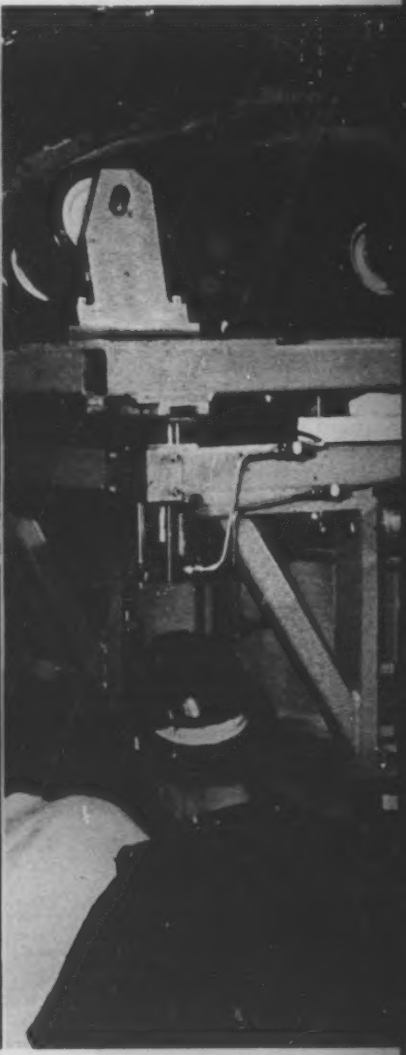
In related news, a broad coalition made up of 11 industry and consumer groups urged Congress to give the Treasury Department the responsibility for implementing the allowance auction program in the Clean Air Act Amendments, still in conference as of mid-September. Both versions give the Environmental Protection Agency exclusive responsibility for the auction.

"The Treasury Department has the expertise necessary to minimize the administrative burden of these programs, and therefore help assure a workable and efficient market for allowances," the groups told Congress.

For more NAPAP and Clean Air news, see *EL&P*, April, p. 1, and future issues.

DAY 1

DAY 6



DAY 11

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32 days. And your stator never leave the ground.

We work with you to define a precise and complete work schedule. 38,513 stat of-the-art parts are tested and shipped

from page 1

Oil price hikes...

increased to about nine times the preembargo price, according to the National Coal Association. (Other industry statistics appear at the end of this report.) These increases resulted in fuel switching, decrease in oil-fired dependency, and slowed demand, skewing traditional utility growth curves.

Rate hikes; cheaper oil in stock

Customers of utilities reliant on oil-fired generation for the majority of their capacity can expect rate hikes from the higher oil prices. These added costs are usually passed directly to customers in a fuel clause. But credit agencies warn that utilities faced with these hikes, might receive less favorable treatment from regulators on pending or near-future rate hikes.

Oil price hikes hit during the tail-end of the summer season, when utilities may rely more heavily on oil for peaking plants. However current oil stocks, purchased at lower prices, could carry some utilities through the peaking season (see below).

Utility fleets will incur higher gasoline prices. Some Iraq-Kuwaiti replacement oil is "sour," higher-sulfur crude, unsuitable for some U.S. gasoline refineries, oil companies explained.

Utility groups promote efficiency

Representatives of EEI and their European counterparts in the International Union of Producers and Distributors of Electrical Energy (UNIPEDE) met in Zermatt, Switzerland, the first week in September to discuss topics including oil supply vulnerabilities.

In a joint statement, EEI and UNIPEDE said, "Electricity offers an excellent opportunity to reduce the use of oil in many applications because it can be produced from a wide variety of fuels and in a wide variety of ways, including renewables and nuclear."

Both groups urged conservation of energy resources and supported measures leading to increased energy efficiency. They also encouraged policy makers to exercise leadership in promoting consistent long-range measures to support siting and construction of necessary electric generating plant and transmission facitilities.

Expected hike: natural gas demand

Some analysts suggest severe increases in oil prices could ripple into natural gas, a fuel that's due to supply more than half of the new U.S. generating capacity over the next eight years. Increased demand for gas by fuel switching could contribute to that a short-term increase in the spot market and long-term increases as contracts expire.

A representative of the American Gas Association said that plentiful U.S. natural gas supply could immediately replace the equivalent of 160,000 barrels of oil per day. If additional pipelines are added, natural gas could replace 480,000 bbl/day, according to AGA's Carl Erickson, quoted in *Public Power Weekly*, Aug. 13.

That publication reported that public power utilities have switched from oil to natural gas where possible.

Crisis, non-oil solutions

Industry leaders for various non-oil fuels and energy supplies are promoting additional investments in their areas as a result of the crisis. The Department of Energy said, however, it expects no dramatic change in the developing National Energy Strategy due to the crisis. Large emphasis has already been placed on energy efficiency in the emerging NES (*EL&P*, May '90, p.3).

DOE had mentioned the possibility of dipping into the National Strategic Petroleum Reserve, but the administration said the shortfall doesn't yet warrent touching the reserve. At its own facilities, DOE instituted fuel-switching where practical and increased efficiency to save oil.

The International Energy Agency governing board meeting in Paris, completed on Aug. 31, also discussed the energy crisis.

Secretary of Energy James D. Watkins said, "The IEA, with the strong support of the United States, called upon its member countries to act in concert to reinforce long-term energy security by strengthening policies to promote greater energy efficiency, conservation, fuel diversity, and increased indigenous oil production.

"The steps we are taking," Watkins continued, "are consistent with the IEA call and demonstrate our resolve to act in coordination with our allies to mitigate the effects of the Iraq-Kuwaiti oil shortfall."

U.S. and world oil reserves were at near record levels at the time of the crisis, but DOE still plans to:

- Monitor oil inventories.
- Start advertising in the second week of September to encourage conservation.
- Promote gasoline that includes alcohol or methanol.
- Try to encourage burning garbage as electricity and steam fuel.

Sustained higher oil prices could increase oil companies' domestic production and exploration into regions considered unprofitable at lower prices. DOE may take direct steps to encourage more U.S. production. The administration said it believed that tax breaks might be possible to encourage domestic drilling.

Several opinion polls address related issues. In a recent survey, 86 percent of those responding said conservation should be a part of an energy strategy. The same percentage said the U.S. needs to adopt a new national energy policy (which it is doing). Texaco Inc. had Penn + Schoen Associates Inc. conduct the 978-interview survey during August.

A recent Gallup Organization poll of 1012 adults, released by U.S. Council for Energy Awareness, said 70 percent of the respondents agreed that nuclear generated electricity reduced dependence on foreign oil. About 78 percent said nuclear energy would be either very important or somewhat important in meeting future energy needs.

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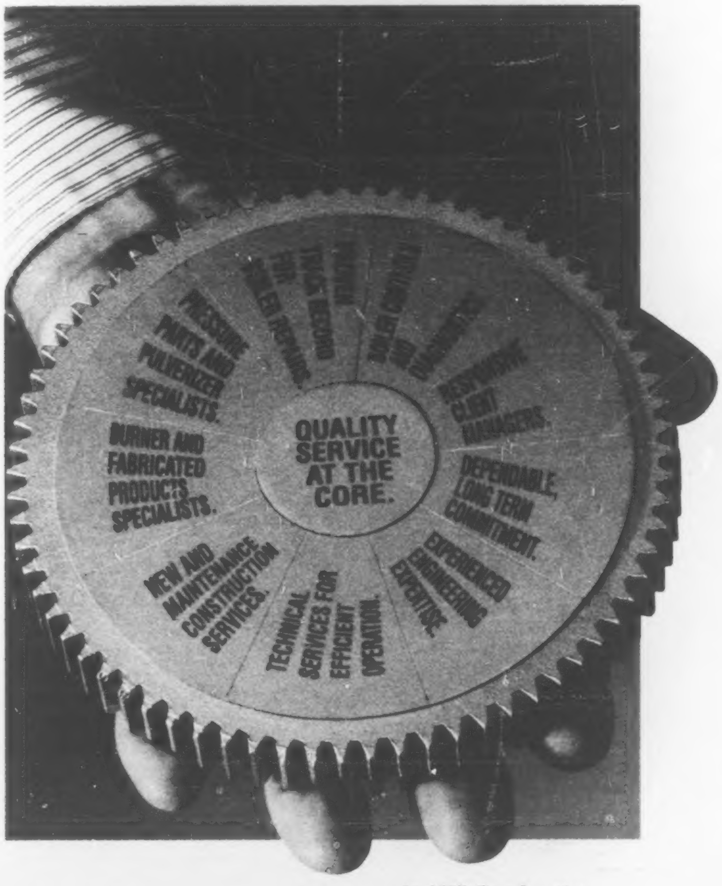

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Oil markets, in times of crisis, can react sharply to rumor, suggestion and anticipation, before any actual change in supply occurs. For instance, oil prices dropped nearly $2 a barrel on Aug. 29 after OPEC decided to replace the oil production shortfall from the Iraqi/Kuwaiti oil blockade.

Financial markets are also affected. The Dow Jones Industrial average plummeted below 2500 in the days following Iraq's invasion of Kuwait because of oil supply uncertainties and the risk of war and/or recession. The 15 stocks in the Dow Jones Utilities average, above 212 in July, fell to below 200 in late August.

Although still jitterish, markets responded favorably to presidents' George Bush and Mikhail Gorbachev Sept. 9 commitment to support stringent United Nation's sanctions against Iraq.

In other news, several major suppliers to the electric utility industry have subsidiary operations with employees and assets at risk in Kuwait. These include Asea Brown Boveri, of Stamford, CT, and Bechtel Group Inc., of San Francisco.

Oil-reliant utilities, statistics

The 10 most oil-dependent utilities by percentage of generation as of Dec. 31, '89, were Hawaiian Electric Co., Commonwealth Energy Systems, Long Island Lighting Co., Central Maine Power Co., Consolidated Edison Co., Boston Edison Co., Eastern Utilities Associates, Central Hudson Gas & Electric Co., Public Service Co. of New Hampshire and Florida Power & Light Co., according to Mabon, Nugent & Co., in Boston, MA.

The country relied on oil for 5.7-percent of its electricity generation in 1989, using 266.9 million barrels of oil (Mbbl). In 1989, as a percentage, New England relied on oil-fired generation the most, but the Middle Atlantic area used the most oil. These statistics are according to the DOE's Energy Information Administration (EIA) December '89 *Monthly Energy Review*.

In April 1990, the average cost of petroleum delivered to electric utilities was $16.44 per barrel, down from the year's previous high of $25.56 in January, due to high demand from cold-weather, said EIA. Year-to-date deliveries to utilities through May were down 16 percent, primarily due to milder weather.

War in the Mideast could cause the price to jump to $50/bbl within six months, some analysts contend.

Utilities had 70,608 thousand barrels of oil in stock at the end of May; utilities used an average of 22,239.7 thousand barrels per month in 1989, according to EIA, but more during peaking periods.

Largest producers

The world's largest producers of crude oil (including condensates) for the first five months in '90 in decending order are: USSR, U.S., Saudi Arabia, Iraq, China, and Mexico, according to DOE records.

Together, Iraqi and Kuwaiti fields represent 20 percent of the world's proven oil reserves; the Mideast holds about two-thirds of the total, DOE said.

Utilities set peaks

BARRINGTON, IL—New one-hour peaks were recorded recently by the following utilities:

- Dayton Power & Light Co., 2643 MW on Sept. 6, up from 2604 MW on July 9.
- Northern Indiana Public Service Co., 2739 MW on Sept. 6, up from 2738 MW on Aug. 28.
- Kansas Gas & Electric Co., 1763 MW on Aug. 28, up from 1741 MW on July 2. KG&E said its peak usage through August has grown more than 12 percent, faster than any other U.S. utility.
- Consumers Power Co., 5881 MW on Aug. 27, up from 5869 MW on Aug. 17, '88. The company said it's on its way to a seventh consecutive record sales year.
- Sierra Pacific Power, 936 MW, July 11, up from 922 MW on Feb. 7, '89.

Supplier changes name

WARRENDALE, PA—WM Power Products Inc. changed its name to Mitsubishi Electric Power Products Inc.

The change reflects new ownership of the supplier, which started in 1985 as a joint venture of Westinghouse and Mitsubishi Electric.

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2 oil-fired utilities

in August was purchased and delivered in July at $16.30/barrel (1-percent sulfur). A late August purchase cost $26.77, a 64-percent hike. The plant uses 12-million barrels of No.6 crude/year. LILCo also uses more expensive 0.7-percent and 0.3-percent sulfur No.6 fuel oil.

LILCo customer bills would increase about 2 percent from August to September due to the oil-price hikes, said LILCo's Joan Cears; the seasonal discontinuation of summer rates will offset a larger October hike. The August residential rate was 14.5¢/kWh. The May cost, without summer rates, was 13.4¢/kWh. At LILCo, about 30¢ of every $1 spent is for fuel.

LILCo—in part due to never-obtained Shoreham nuclear capacity in the shutdown deal with the state—will spend $35.2 million on 19 conservation programs in 1990. State regulators require LILCO's Energy Conservation and Load Management Department to file a two-year plan. Goals are to cut 188 MW by year's end; of that, 28 MW are slated residential, 154, commercial. The utility was ahead of schedule as of July.

Programs include direct load control programs for air conditioning and other appliances (25,000 switches installed to date); Dollars and Sense, cash for efficiency improvements (1990 goal: 1363 participants, 8.4 MW); Power Alert, consumer alert for a reduction of 42.4 MW.

Selective vegetation control is for the birds.

And for deer, elk and other wildlife species. Population counts in many studies verify the natural attraction of lush, grassy right-of-way openings at forest edge for nesting, foraging and cover to wildlife.

The secret: Modern *selective* herbicides from DowElanco enhance habitat conditions by removing only broadleaf weeds and woody plants. This allows annual and perennial grasses to thrive, free from competition for moisture, sunlight and soil nutrients. Wildlife authorities note that food production benefits show up almost immediately once the right-of-way is opened with herbicide treatment. Also, with selective herbicide control, there's little or no soil disturbance—a problem that can lead to erosion and disrupt the environment when only mechanical methods are used for vegetation control.

And for right-of-way managers looking for low-maintenance benefits.
Research also proves that selective herbicides from DowElanco are more effective than other products. For example, they give excellent broad spectrum control against stubborn species most herbicides can't handle. Because they control the whole plant, results are longer lasting. Right-of-way maintenance typically can be extended to a 5-year cycle instead of the usual 2- to 3-year period.

To get the complete story on selective vegetation control, contact your DowElanco sales representative. Or phone 1-800-258-2436.

Inquire R.S. 25

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Industrial Vegetation Management

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